Stress, Psychosocial Factors, and the Outcomes of Anxiety, Depression, and Substance Abuse in Rural Adolescents

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For Abbie…
My daughter, who daily, restores my faith in the future of this world .
She is my reason for being.

I would like to thank God. It is through His grace that I was led down this road and given the abilities to achieve my goals.

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University of Pittsburgh, 2005

Mental disorders cost the United States approximately 170 billion dollars in just one year (HHS, 2002). The onset of a diagnosable mental disorder such as anxiety, depression, and substance abuse can begin in adolescence. Rural adolescents are at risk for negative outcomes due to psychosocial/socioeconomic stressors and a lack of access to health care.

This secondary data analysis used a cross-sectional sample of 466 adolescents from four rural high schools in western Pennsylvania to examine the relationships among demographic variables (age, gender, birth order, parents present in household, subject having a job), stress (life events), psychosocial factors (optimism, perceived social support, coping), and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking). Lazarus' Theory of Stress and Coping and Lerner's Developmental Contextualism was used to form the theoretical framework. Descriptive statistics, correlational and regression analysis were the primary methods of analysis.

Over 33% of the subjects reported depressive symptoms; 20% reported higher levels of anxiety symptoms. Approximately 74% report that they have used alcohol at least once; 53% report having tried at least one other drug such as cocaine or marijuana. Over 38% smoke cigarettes at least occasionally.

Gender differences were found in the sample. Females reported greater anxiety and depressive symptoms than males. Gender had both a direct and indirect effect on the outcomes of anxiety and depression with negative life events and psychosocial factors (optimism, social support, and coping) acting as mediators. Stress, optimism, perceived social support of family, and avoidance coping were found to have a mediating effect on the relationship between demographics and substance abuse. The results of this study support the proposed model and the hypotheses that stress and psychosocial factors are mediators between the relationships among the demographic and outcome variables.

Empirical data gathered and reported in this and other studies will assist health care professionals (e.g., physicians, nurse practitioners, and school nurses) to develop and implement interventions that target mediating variables such as coping. These interventions have the potential to improve rural adolescents' ability to socialize, adapt, and cope; assisting them in making better decisions and growing into productive, healthier adults.

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Introduction

A. Background

In a country with an estimated population of over 293 billion people (U. S. Census Bureau, June 1, 2004), the health of the individual can certainly have an effect on not only the individual, family, and/or community, but also the nation as a whole. According to the United States Department of Health and Human Services (HHS), the direct costs (diagnosis and treatment) and the indirect costs (lost productivity, illness, disability, death) of mental disorders cost the United States a total of approximately 170 billion dollars in just one year (HHS, 2002). The onset of a diagnosable mental disorder (e.g., outcomes such as anxiety, depression, and substance abuse) or chronic health problem can often begin when an individual is young, in childhood or adolescence. At least one in five children and adolescents between age 9 and 17 years has a diagnosable mental disorder in a given year (Shaffer, Fisher, Dulcan, et al., 1996). In 1999, the suicide rate for children aged 10-14 years old and 15-19 years old was 1.2 and 8.0 per 100,000, respectively (HHS, 2000). Suicide attempts in 1999 by adolescents in 9^{th}-12^{th} grades that required medical attention were 2.6% (HHS, 2000).

Adolescents are no longer children, yet not quite adults. Physical problems and emotional problems can develop when adolescents make decisions to take adult risks with the limited knowledge and experience of a child. Some risk taking behaviors that can impact the mortality and morbidity of adolescents in the United States include: smoking, binge drinking, using illegal drugs, and driving while or riding with someone

who is under the influence of drugs/alcohol. In 1999, 40% of adolescents in grades 9 through 12 reported that they used tobacco (HHS, 2000). In 1998, 8.3% of 12-17 year olds reported that they had used marijuana in the past 30 days, while 7.7% reported that they engaged in binge drinking alcohol (HHS, 2000). Approximately 33% of students in grades 9 through 12 reported in 1999 that they had, in the past 30 days, rode with someone who was driving a car under the influence of alcohol. In 1998, death or injury was caused by alcohol and drug related car accidents in 13.5 of every 100,000 individuals age 15 to 24 years old (HHS, 2000). Nurses and other health care professionals working in the medical and mental health arenas see the impact of these decisions every day. These decisions can affect the adolescent, their families, their community, and ultimately the nation. Outcomes of these decisions include substance abuse or addiction, injury, and even death.

In 2000, in an attempt to continue to improve the health of the nation, the United States Department of Health and Human Services- Office of Disease Prevention and Health Promotion published the Healthy People 2010 initiative (HHS, 2000). Based on data collected by numerous agencies in a collaborative effort, 10 Leading Health Indicators (LHIs) were identified as major health concerns for the country. These LHIs will be used to measure the health of the people of the United States over a 10-year period. Two goals to 'Increase the Quality and Years of Healthy Life' and to 'Eliminate Health Disparities' were also identified. Based on this, there were 28 focus areas and 467 specific objectives developed.

Four of the LHIs identified in Healthy People 2010 were: tobacco use, substance abuse, mental health, and access to health care. Two of the 28 focus areas are: 'Maternal,

Infant, and Child Health' and 'Mental Health and Mental Disorders'. Based on the two focus areas listed above and the four LHIs, 21 critical health objectives were identified for children and adolescents. These included: decreasing substance abuse among 12-17 year olds; decreasing smoking tobacco among 9^{th}-12^{th} graders; proportionally increasing access to mental health treatment for those diagnosed with mental health problems; and reducing the suicide rate for 10-19 year olds (HHS, 2000).

Although mental health diagnosis and mental health disorders are seen in all populations of the United States (HHS, 1999; Hoagwood & Olin, 2002), according to the HHS, there are some clear differences in the way these diagnosis/disorders can be prevented; how they manifest; the way they can be diagnosed; and what types of treatment may be successful (HHS, 1999). Differences can be seen between individuals of different gender, age, race, and ethnicity (HHS, 1999). To understand the prevalence and the cost of mental health diagnosis and disorders in the United States is not enough. The rate of mental health disorders in children and adolescent populations continue to rise. Our practices and interventions do not necessarily reflect the knowledge being gained through research. We need to discover the origins of increase in disorders and develop "useful and usable treatment approaches" to treatment (Hoagwood & Olin, 2002). To successfully prevent and treat mental health diagnosis and disorders, researchers must begin by studying and comparing different populations. Populations who are being underserved by research and clinical services can be negatively affected with regards to their health care outcomes. Rural adolescents were previously understudied. However, due to the increase in mental health disorders (e.g., outcomes such as anxiety, depression, and substance abuse), limited access to health care, and a

previous lack of research on populations in rural areas, rural adolescents are now a population of interest. Mental health, according to Healthy People 2010 is "a state of successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with adversity"(HHS, 2000, p. 18-3). Gathering empirical data to develop appropriate, accessible interventions can prevent mental disorders, improve diagnosis, and improve the functioning of those rural adolescents who have already been diagnosed. This in turn will improve their ability to socialize, adapt, and cope, assisting in making them to grow into productive, healthier adults.

B. Purpose and Aims

The purpose of this secondary data analysis was to examine the relationships among demographic variables (age, gender, birth order, parents present in household, subject having a job), stress (life events), psychosocial factors (optimism, perceived social support, coping), and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents. The specific aims were to: 1) explore and describe the characteristics of the sample; 2) examine the bivariate relationships among demographic variables (age, gender, birth order, parents present in household, subject having a job), stress (life events), psychosocial factors (optimism, perceived social support, coping), and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents; and 3) examine the mediating role of stress and psychosocial factors to explain the relationship between the demographic variables (age, gender, birth order, parents present in household, subject having a job) and the outcomes

of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents.

C. Hypotheses

It is hypothesized that:

1.0 The proposed model describes the structure of relationships among the selected variables (demographics, stress, and psychosocial factors) as they influence the outcomes of anxiety, depression, and substance abuse in rural adolescents (see Figure 1).

1.1 There will be a direct relationship between selected demographic variables (age, gender, birth order, parents present in household, subject having a job) and the outcomes of anxiety, depression, and substance abuse.

1.2 There will be a direct relationship between selected demographic variables (age, gender, birth order, parents present in household, subject having a job) and stress (life events).

1.3 There will be a direct relationship between selected demographic variables (age, gender, birth order, parents present in household, subject having a job) and psychosocial factors (optimism, perceived social support, and coping).

1.4 There will be a direct relationship between psychosocial factors (optimism, perceived social support, and coping,) and the outcomes of anxiety, depression, and substance abuse.

1.5 There will be a direct relationship between stress (life events) and the outcomes of anxiety, depression, and substance abuse.

1.6 There will be a direct relationship between stress (life events) and psychosocial factors (optimism, perceived social support, and coping).

1.7 The relationship between stress (life events) and outcomes of anxiety, depression, and substance use will be mediated by psychosocial factors (optimism, perceived social support, and coping).

1.8 The relationship between demographics (age, gender, birth order, parents present in the household, and subject having a job) and outcomes of anxiety, depression, and substance abuse will be mediated by psychosocial factors (optimism, perceived social support, and coping).

1.9 The relationship between demographics (age, gender, birth order, parents present in the household, and subject having a job) and outcomes of anxiety, depression, and substance abuse will be mediated by both stress (life events) and psychosocial factors (optimism, perceived social support, and coping).

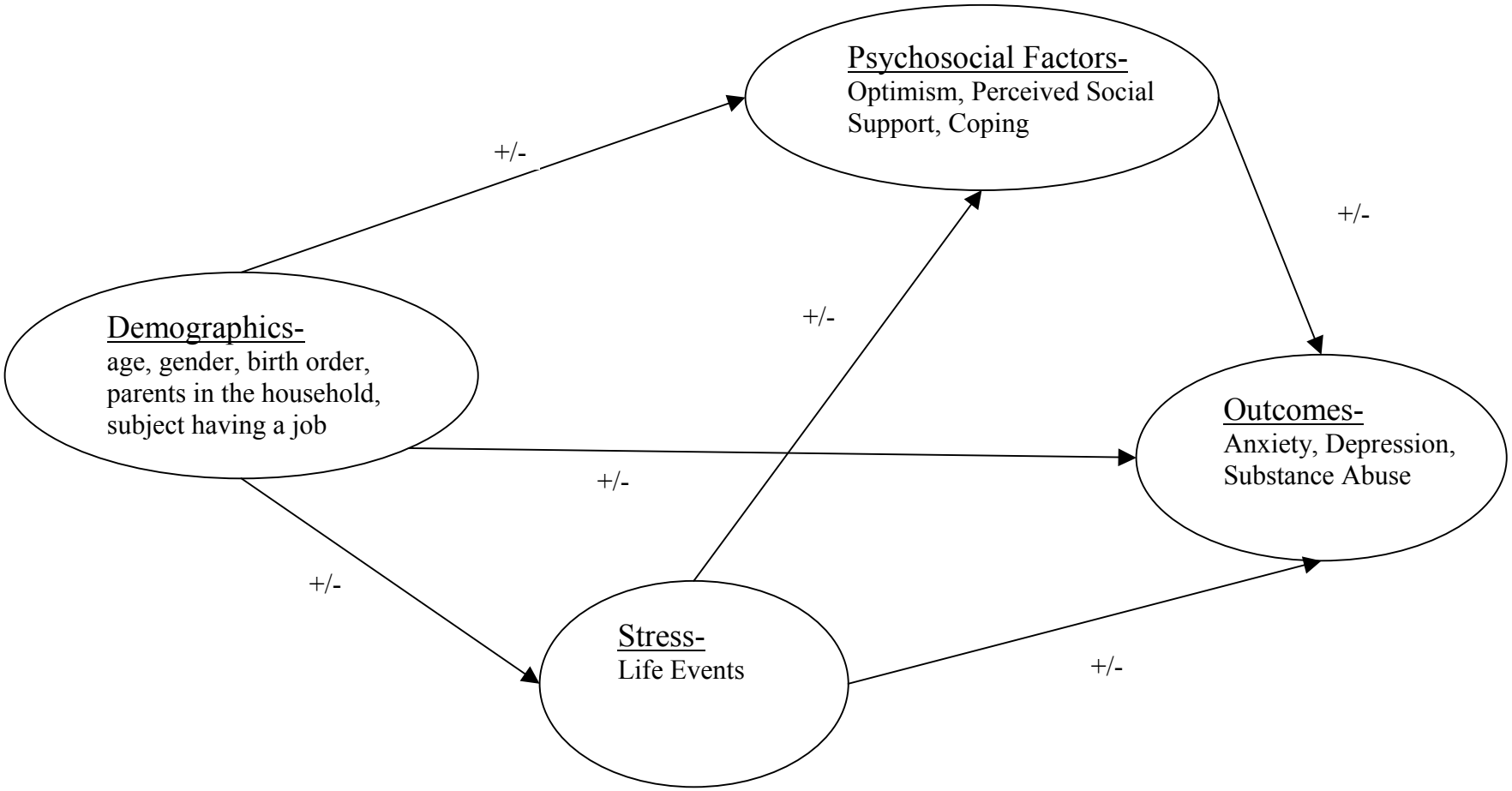

Figure 1. Structural model of relationships among the variables: Demographics, Stress, and Psychosocial Factors and the Outcomes of Anxiety, Depression, and Substance Abuse in Rural Adolescents.

D. Theoretical Framework

The theoretical Framework chosen will be a combination of Lerner's Developmental Contextualism (1995) and Lazarus's Theory of Stress and Coping (1966). They are reviewed below.

1. Lerner's Life Span Perspective

Lerner's Life-Span Perspective (or Developmental Contextualism) was developed in the 1980's as a framework to begin to explore the bi-directional (reciprocal) relationships present between biological and psychosocial changes in the individual (1987, p. 10). In particular, Lerner chose to test his theory during the developmental period of early adolescence because it is a time where change is both rapid and immense (Lerner & Foch, 1987, p. 1). Lerner's theory is based on four constructs: plasticity, embeddedness, dynamic interaction, and temporality.

The first construct is the belief that an individual was a changing being and at any given time across the lifespan, was capable of change (Lerner, 1987, p. 13). This characteristic of the individual was known as plasticity. Plasticity has two components. The first is continuity, which consists of traits such as demographics and personality functions. The second is discontinuity, which includes normative influences (i.e., biological and environmental determinants correlated with age or history) and non-normative influences (i.e., life events that are not related to time or age and may or may not occur for an individual. An example of discontinuity is parental divorce) (Lerner & Foch, 1987; Lerner, 1996).

Lerner's construct of embeddedness refers to the concept that no human lives alone or is isolated from everything in the environment around them. There are 'multiple

levels of being' (inner-biological, individual-psychological, dyadic, social network, culture, community, societal, etc.) that influence each other and the individual (Lerner, 1987, p. 13). Lerner believed that changes in the individual can occur due the construct of embeddedness. The reciprocal relationship between the individual process (the person) and the multi-context process (the person's environment) due to embeddedness is known as the construct dynamic interaction.

The final construct is temporality. With time, change occurs. Throughout history change has shown to be persistent, continuous, and never-ending (Lerner, 1996). The basis for Lerner's model is that at any point in time the multiple, interdependent, levels at which life exists may influence the individual. Because all of the areas, including the individual, are interdependent and with time change is always a possibility and persistently occurring. It would therefore be possible for an individual to change at any given time (plasticity). Because the individual interacts with each level, the individual would not only be changed but also have the ability to affect change. There would also be the potential for intervention to assist the individual in making positive, healthy changes.

2. Lazarus' Theory of Stress and Coping

Lazarus' Theory of Stress and Coping is based on the thought that coping is a process. Concepts of the theory include: causal antecedents such as personal variables and environment; mediating and moderating processes such as appraisal, coping, and perceived social support; immediate effects such as physiological changes or positive/negative feelings; and long term effects such as somatic health/illness or

impaired function and morale (Lazarus & Folkman, 1984, p. 305, 308). Stress is defined as a relationship between the person and the environment that the person views as difficult or challenging. The person believes that the relationship is exceeding his/her resources and endangering his/her well being (Lazarus & Folkman, 1984, p. 19). The environment refers to the life events that can occur. Appraisal refers to the way person assesses these events. The way the person perceives and responds to these life events (stressors) can be affected by their personal characteristics, life orientation, their environment, and their ability to cope. Coping is the psychological process that occurs when a person in struggling to manage psychological stress (Lazarus & Folkman, 1984, p. 3). It is a person's assessment and subsequent response to life events and/or changes in their environment. The process of coping evolves and changes over time. Depending on the coping process and the type of coping utilized, the short-term immediate consequence or long-term adaptational effect/outcome can be either positive (adaptive) or negative (maladaptive).

E. Hypothesized Conceptual Model

Combining Lerner's Developmental Contextualism and Lazarus' Theory of Stress and Coping provides the framework for the hypothesized conceptual model for this secondary data analysis. Both theories endorse a model with multiple context processes or levels. Lerner's theory, tested in adolescents due to their rapid and changing developmental period, allows for the concepts of bi-directionality of relationships. Lazarus' theory shows coping, as it is affected by multiple factors (e.g., social and psychological factors) in a person's life, affecting outcomes. Previous studies (Puskar, Sereika, Lamb, Tusaie-Mumford, & McGuinness, 1998; Puskar, Tusaie-Mumford,

Sereika, & Lamb, 1999; Tusaie-Mumford, 2001) have utilized selected concepts from both Lerner's Developmental Contextualism and Lazarus's Theory of Stress and Coping. The concepts selected by these researchers were used to develop models in order to begin exploring the utilization of coping methods, optimism, depression, life events, anger, risk behaviors, and psychosocial resilience in rural adolescents, respectively. Results from the Puskar study entitled Intervention to Promote Mental Health in Rural Youth' (NINR, NIH Grant #R01 NR03616) have been used to successfully design and implement school-based interventions to improve coping skills in rural adolescents.

For the purpose of this secondary study, the concepts chosen are: Causal Antecedents (Lazarus), Plasticity-Discontinuity (Lerner), Mediating Processes (Lazarus)/ Embeddedness (Lerner), Effects (Outcomes)-(Lazarus)/ Dynamic Interaction (Lerner), and Temporality-Time/History (Lerner). Causal Antecedents will be represented by the demographic variables of interest (age, gender, birth order, parents in the household, and job). Plasticity-Discontinuity will be represented by the variable of interest known as 'stress' to Lazarus, (i.e., life events). The combined concept of Mediating Processes and Embeddedness will be represented by the variables optimism, perceived social support, and coping. Effects (outcomes) / Dynamic Interaction will be represented by anxiety, depression, and substance abuse (alcohol, drugs, and smoking). The final concept of Temporality is addressed by the design of the secondary data analysis, which is cross-sectional in nature. (See Figure 2 and Figure 3).

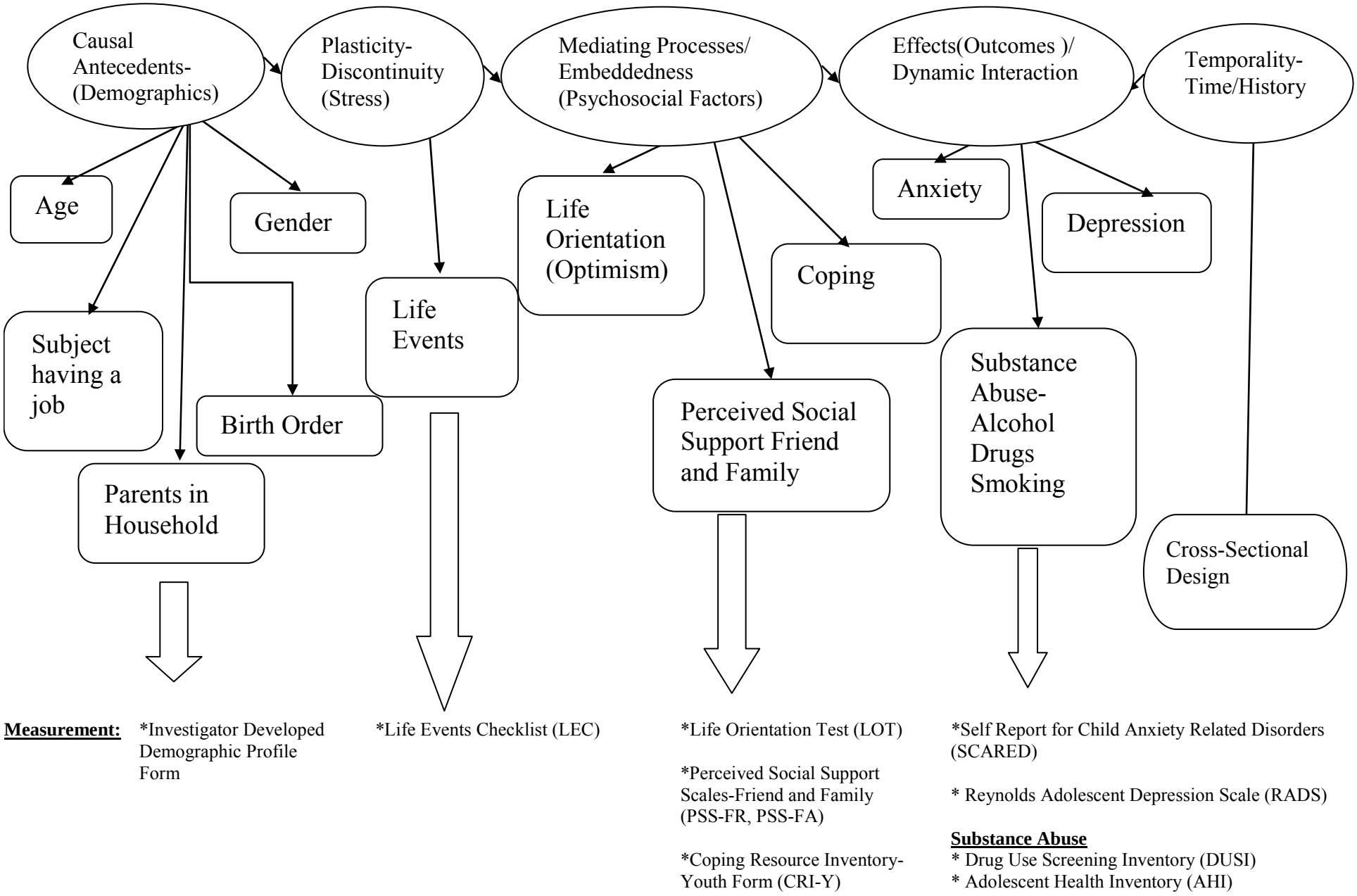

Figure 2. Theoretical Model combining concepts from Lerner's Developmental Contextualism and Lazarus's Theory of Stress and Coping for the secondary data analysis entitled: Stress, Psychosocial Factors, and the Outcomes of Anxiety, Depression, and Substance Abuse in Rural Adolescents.

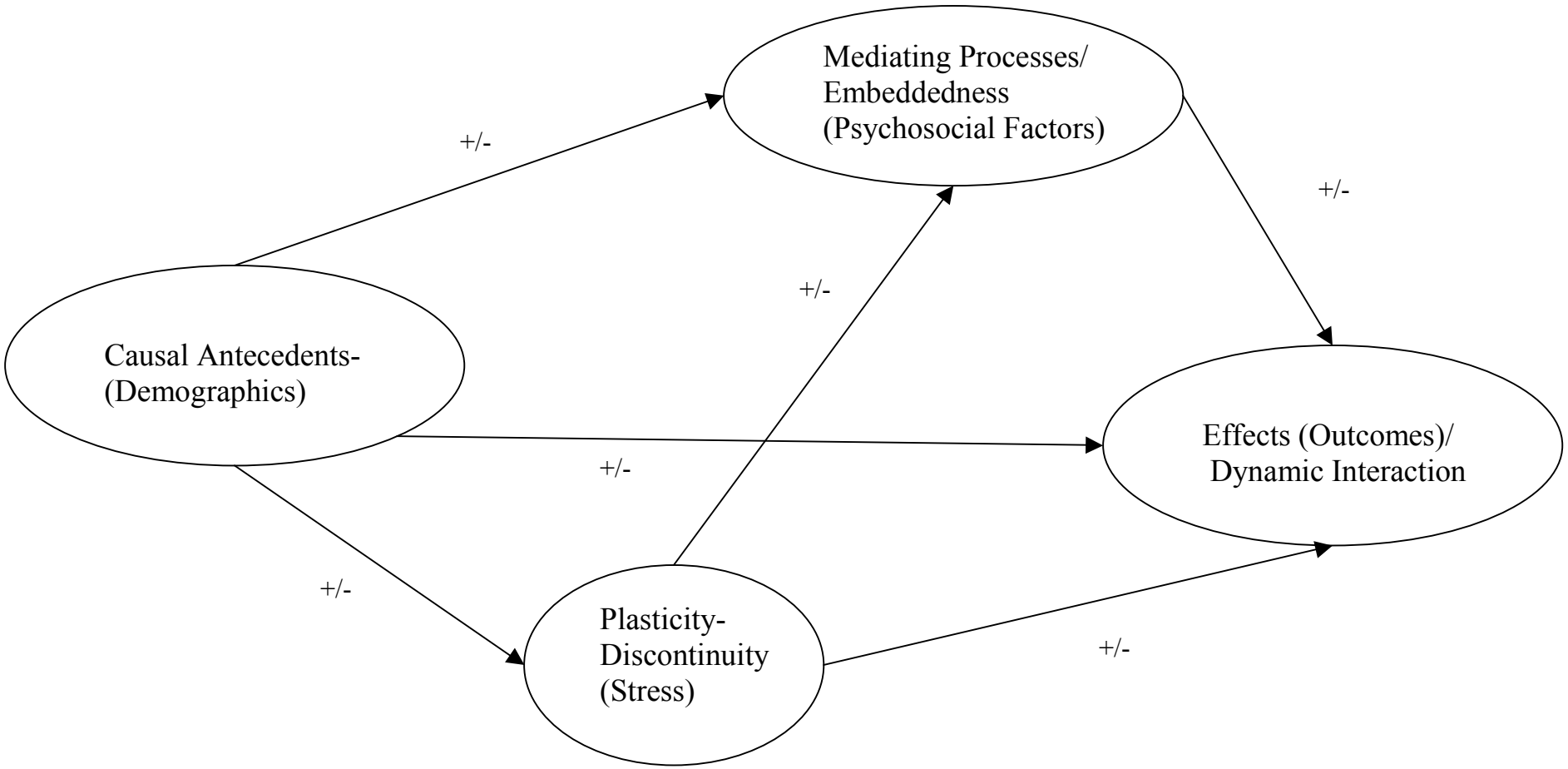

Figure 3. Structural model of relationship among the variables: Demographics, Stress, Psychosocial Factors, and the Outcomes of Anxiety, Depression, and Substance Abuse in Rural Adolescents as related to the combined concepts from Lerner's Developmental Contextualism and Lazarus' Theory of Stress and Coping.

F. Definition of Terms

1.Rural

Theoretical: An area that has a population center of less than 2,500 people and is characterized by open country is designated as rural (U.S. Department of Commerce Bureau of Census, 1991). Rural areas have a core with a population density of less than 1,000 people per square mile and may contain an adjoining area of less than 500 people per square mile. Urban areas must have over 1,000 people per square mile and may have over 500 people in adjoining areas (Economic Research Service, 2002).

Operational: The primary study was conducted in a rural high school in a rural county located in southwestern Pennsylvania. The 'rural criteria' was assessed by using the State of Pennsylvania's criteria for designating a county as rural by socioeconomic/demographic information previously collected by the State of Pennsylvania.

2. Adolescent

Theoretical: The Oxford English Dictionary (1961, p. 123), defines adolescence as "the process or condition of growing up; the growing age of human beings; the period which extends from childhood to manhood or womanhood; youth; ordinarily considered as extending from 14 to 25 years of age in males and 12 to 21 years of age in females." The term adolescence was then developed to distinguish between the state of being young and the actual process or condition of growing up. Adolescence, though not having one universally accepted definition, is a term accepted and used to refer to the time period between childhood and adulthood. Youth who are going through this stage of life are

commonly referred to as adolescents. According to Erikson, an adolescent is a person 12-18 years old in Psychosocial Development stage 5 of 8, Identity vs. Role Confusion (1968).

Operational: Based on the subject's self report of age on the investigator-developed demographic questionnaire in the primary study, any subject reporting they are between the ages of 12-18 years will be considered an adolescent.

3. Stress

Theoretical: Lazarus and Folkman (1984) define stress as a relationship between the person and the environment that the person views as difficult or challenging. The person believes that the relationship is exceeding his/her resources and endangering his/her well-being (p. 19).

Operational: For the purpose of this study, stress will be measured by life events. These life events can be appraised by the subject as either being a good event or a bad event having either a positive or a negative effect.

a. Life Events

Theoretical: Lerner (1987) defines life events as non-normative influences that do not occur for all people and for those that they do occur for, they do not occur at the same time or for the same duration (p. 13). Examples of life events that can impact adolescents are: illness, divorce of parents, or death of a parent (Lerner, 1987, p. 13).

Operational: The Life Events Checklist (LEC) is a self-report scale that measures life events (both positive and negative) and the effect of those life events on older

children and adolescents (Johnson & McCutcheon, 1980). It consists of 46 items plus four additional spaces for subjects to write in significant events experienced by the subject but not listed on the scale. The LEC yields five scores: a positive life events score, an effect score for positive life events, a negative life change score, an effect score for negative life events, and a total life change score. For the purpose of this study four of the scores (positive life events score, effect score for positive life events, negative life change score, effect score for negative life events) will be utilized to represent measures of stress.

4. Psychosocial Factors

Theoretical: The definition of psychosocial factors is developed by combining the Merriam-Webster's dictionary (1997) definitions of psychological, "of or relating to the state of mind and behavior of an individual or a group" (p. 592); social "of or relating to human society" (p. 690-691); and factor "an agent" or "something that actively contributes to a result" (p.271). The definition of psychosocial factors is then: an agent of the mind or behavior of an individual or group that actively contributes to a result.

Operational: For the purpose of this study, psychosocial factors will be represented by three variables. These variables are: life orientation (optimism), perceived social support, and coping (see below).

a. Life Orientation

Theoretical: A person's life orientation is a characteristic trait that affects the way s/he views life events. It is their generalized outcome expectancy and can be either pessimistic (negative) or optimistic (positive) (Scheier & Carver, 1992).

Operational: Optimism will be measured by the Life Orientation Test (Scheier & Carver, 1992). It measures optimism by assessing generalized outcome expectancies of individuals. A higher score indicates greater levels of optimism.

b. Perceived Social Support

Theoretical: According to Procidano and Heller (1983), perceived social support is "the extent to which an individual believes that his/her needs for support, information, and feedback are fulfilled" (p. 2). It is an individual's subjective view of how other people, in particular families or peers, are available to meet and/or assist with meeting the individual's needs for comfort and support.

Operational: Perceived Social Support is measured by a 40-item broad scale composed of two subscales, social support of family and friends, having 20 items each. Each subscale measures both close and diffuse social support. It is widely used with adolescent to adult populations to determine a subject's perception of social support from family and friends. The range of scores for each item is 0 to 1. The higher the individual's score on the scale, the greater the perceived social support. Each subscale has its own score (0 to 20). There is no total score.

c. Coping

Theoretical: Per Lazarus and Folkman (1984), coping a psychological process that occurs when a person in struggling to manage psychological stress (p. 3). It is a person's assessment and subsequent response to life events and/or changes in their environment.

Operational: Coping will be measured using the Coping Responses Inventory - Youth Form (CRI-Y) a 48-item instrument that assesses how adolescents age 12-18 years cope with a variety of stressful life events (Moos, 1993). The instrument has eight subscales. Four measuring avoidance coping and four measuring approach coping.

5. Outcomes

Theoretical: According to Merriam-Webster (1997) an outcome is a final consequence (p. 523).

Operational: For the purpose of this study, outcomes in rural adolescents will be represented by anxiety, depression, and substance abuse (alcohol, drugs, smoking).

a. Anxiety

Theoretical: Anxiety is feeling tense or fearful. Some levels of anxiety can be normal, even positive (adaptive). However, when the feeling of anxiety is pervasive and begins to negatively affect a person's daily functioning (personal, work, or social) or has a negative affect on those around them, it becomes a disorder. Other symptoms may also include feeling restless, irritable, having difficulty concentrating, or difficulty sleeping. Generalized Anxiety Disorder is when a person is feeling tense or anxious most of the time for at least 6 months. According to Morrison (1995, p. 246-7) a person may have more than one anxiety disorder if they have symptoms that qualify for diagnosis in different anxiety disorder categories, based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) published by the American Psychiatric Association. Examples of other anxiety disorders include: panic disorder, social phobia, obsessive

compulsive disorder, and post traumatic stress disorder. A person may also have some symptoms of different anxiety disorders, but not meet the classification for diagnosis for any of them. In this case the person is diagnosed with Anxiety Disorder Not Otherwise Specified. It is also important to note that generally, anxiety is a symptom also commonly found in most mental disorders (such as depression).

Operational: The presence of symptoms of an anxiety disorder is indicated by a score of 25 or above on the Screen For Child Anxiety Related Emotional Disorders (SCARED) developed by Birmaher, Khetarpal, Brent, Cully, Balach, Kaufman, and Neer in 1997. It was designed to screen children and adolescents for anxiety disorders. In this secondary study, anxiety will be measured using the total score.

b. Depression

Theoretical: Depression is defined as a lowering of mood from normal (Morrison, 1995, p. 191). Symptoms of depression can vary greatly and include: crying, loss of interest or pleasure in previously enjoyable activities, loss of appetite, change in appetite, and change in sleep patterns. When these symptoms become persistent (lasting greater than two weeks), interfere with a person's daily functioning, and have a negative effect on the person and those around them, the person may be diagnosed with depressive disorder.

Operational: The presence of symptoms of depression as set by the developer of the instrument (Reynolds, 1986) is indicated by a total score on the Reynolds Adolescent Depression Scale (RADS). The higher the score on the RADS, the greater the presence of

the symptoms of depression. A score at or above 77 representing the presence of severe depressive symptoms.

c. Substance Abuse

Theoretical: The use of any substance in a way that causes harm or distress to a subject and/or others in their environment (Morrison, 1995, p. 79).

Operational: The presence of substance abuse (e.g., drugs and/or alcohol) will be determined by the density of scores on the Drug Use Screening Inventory (DUSI) (Tarter, 1990). For the purpose of this study, alcohol use will be examined separately from other drug (e.g., marijuana, cocaine, etc.) use. The presence or absence of smoking cigarettes will be determined by a score of +0 through +4 on the Adolescent Health Inventory (AHI) item that asks for adolescent self report of smoking frequency.

6. Demographics

Theoretical: Demographics are the statistical characteristics of human populations (Merriam-Webster, 1997, p. 208).

Operational: Demographics will be measured using the investigator developed demographic profile form from the primary study. The form obtains information on the characteristics of each subject such as age, race, grade, gender, academic curriculum, job history, transportation to school, family members in the home, number of siblings, birth order, desire to speak with someone immediately related to any issues, and recent death (with in past year) of any family member or close friend. For the purpose of the secondary data analysis, characteristics such as age, gender, birth order, parents present in

household, and subject having a job, will be considered in the analysis and used to describe the sample.

G. Significance to Nursing Science and Allied Health Disciplines

This study is significant to nursing science and allied health disciplines for several reasons. To prevent the continued rise in the diagnosis of mental disorders and decrease the subsequent costs (financial and otherwise) to the individual and society as a whole, it is imperative that a multidisciplinary approach is taken to study populations at risk (e.g., rural adolescents). For rural adolescents, who can have limited access to treatment-primary care practitioners, the school nurse, or school guidance counselor may be their only opportunity for health care and/or mental health diagnosis and treatment. The knowledge gained from research such as this will allow for greater understanding of the issues that face this population and for the development of empirically based comprehensive interventions. These interventions can be preventative, promotional, diagnostic, or treatment based. Increased public awareness, health practitioner, and even school involvement can ensure that future generations develop into healthy productive adults.

H. Limitations

This study includes several limitations. First, being a secondary data analysis, there are certain limitations including the fact that the goals of the primary study were not the same as those of the secondary study. The data collected may not best support the investigation of the aims posed in the secondary study. Because this is a secondary data

analysis and data has been de-identified, there will not be the opportunity to go back to subjects for corrections if missing data, outliers, unlikely answers, or questionable data are found.

Per Lazarus and Folkman (1984) the use of self-report instruments can have limitations such as issues with memory being incorrect or incomplete and/or misrepresentation (i.e. subjects attempting to show themselves positively). Subjects may also have difficulty with interpreting language and unintentionally incorrectly answer items. Subjects could also misread or skip items and incorrectly mark the instrument, resulting in erroneous data results.

Another limitation is the cross-sectional design. The lack of longitudinal data limits the ability of the investigator to track the patterns in change of the variables (demographics, stress, and psychosocial factors) and their influence on outcomes (anxiety, depression, and substance abuse) over time. There is also the inability to look at these temporal interactions in relation to the adolescent's development into an adult.

Chapter 2

Literature Review

A. Introduction

There are many interrelationships between demographics, stress, psychosocial factors and the outcomes of anxiety, depression, and substance abuse in adolescents. This chapter will identify the relationships among the variables found in past research studies in an effort to support the current study: a secondary data analysis to examine the relationships among demographic variables (age, gender, birth order, parents present in household, subject having a job), stress (life events), psychosocial factors (optimism, perceived social support, coping), and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents.

This review of literature will support the proposed model's description of the structure of relationships among the selected variables (demographics, stress, and psychosocial factors) as they influence the outcomes of anxiety, depression, and substance abuse in rural adolescents. For the purpose of this literature review, the variables of demographics (age, gender, birth order, parents present in household, subject having a job) and stress (life events) are discussed within the context of the reviews of literature for both outcomes (anxiety, depression, and substance abuse) and psychosocial factors (optimism, perceived social support, coping).

B. Outcomes

1. Anxiety

Twenty years ago anxiety was thought to be nothing more than a normal part of adolescence. Today research has improved the understanding of the potential long-term disability associated with anxiety disorders in this population, particularly when excessive and left untreated (Velting, Setzer, & Albano, 2004; Ialongo, Edelsohn, Werthamer-Larson, Crockett, & Kellam, 1994; Ialongo et. al, 1995). In the general adult population, anxiety disorders can be found in anywhere from 2-13% (Morrison, 1995) and in 12-20% of youth (Achenbach, Howell, McConaughy, & Stanger, 1995; Gurley, Cohen, Pine, & Brook, 1996; Shaffer, Fisher, Dulcan, Davis, Piacentini, Schwab-Stone, et. al., 1996; & Velting et.al, 2004). Despite this fact, routine screening for diagnosis of anxiety and mood disorders is not a part of routine primary care (Wren, Scholle, Heo, & Comer, 2003). In fact many researchers are still attempting to determine which anxiety screening tools are actually most effective with specific populations. Anxiety, untreated, can lead to the development of additional mood disorders and substance abuse (Velting et. al, 2004).

2. Depression

Depression is a chronic illness that can initially occur during childhood and adolescence and is present in 1 to 5% of children (Brent & Birmaher, 2002). Without treatment it can last approximately eight months and has a recurrence rate of 40 to 72%, respectively, over the 2 to 5 years following the initial episode (Brent & Birmaher, 2002;

Birmaher, Ryan, Williamson, et. al., 1996). Depression is one of the most significant mental health problems today (Weissman, Bruce, Leaf, Florio, and Holzer, 1991).

3. Substance Abuse

Alcohol use is prevalent among adolescents, with initiation of use occurring at a younger age and amount of use increasing as the child ages. Approximately 80% of adolescents in 12th grade and 50% of 8th graders have used alcohol at least once with 30% and 12 %, respectively, engaging in binge drinking (SAMHSA, 2002). The use of illicit drugs, in particular marijuana, is increasing in adolescents due to a decline in perceived risk. There has been a 12% increase in use by 8th graders from 1991 to 2002 (SAMHSA, 2002; Johnson, O'Malley, & Bachman, 2003). Approximately 40% of adolescents in grades 9-12 reported that they used tobacco (HHS, 2000). Formerly depressed children who experience recurrence of depression or substance abuse disorder within 5 years show impairments in psychosocial functioning, social adjustment and low quality of life (Lewinsohn, et. al, 2003). Initiation of substance abuse can occur at an early age and continue throughout adolescence (Schiffman, 2004). Per a literature review by Schiffman (2004) substance abuse also appears to co-occur with other conditions in adolescents such as depression and suicidality. Long term effects reported to be associated with on going adolescent substance abuse include both cognitive and physical health problems in adulthood (Brook, Finch, Whiteman, & Brook, 2002).

C. Psychosocial Factors

1. Optimism

Evaluating optimism as a predictor of outcomes, Scheier, Carver, and Bridges (1994) found that even when controlling for variables such as: self-mastery, trait anxiety, and neuroticism, optimism still has a statistically significant correlation with presence (or lack of) depression and is associated with active coping such as seeking social support instead of using drugs or alcohol. Individual differences in optimism impact adjustment to stress/life events (Scheier, Carver, & Bridges, 2001; Scheier, Weintraub, & Carver, 1986). Life events are times of risk and opportunity for the adolescent (Patterson, 2001). Higher levels of optimism are associated with less mood disturbances and better adjustment to life stressors (Segerstrom, Taylor, Kemeny, & Fahey, 1998). There appear to be some indirect relationships between optimism, stress, and perceived social support in a population of college freshman at a major university (Brissette, Scheier, & Carver, 2002). This study showed that increased optimism, perceived social support, and coping are associated with decreased depression (Brissette, et. al, 2002). This finding needs to be further examined in other populations. Bivariate statistical analysis should assist in determining if this relationship is found within rural adolescent populations as well (Specific Aim 2).

2. Perceived Social Support

Perceived Social Support (PSS) has been shown to be a mediating factor between stress (negative life events) and adverse outcomes (Greenberg, Seigel, & Leitch, 1983; Wills, Vaccaro, & McNamara, 1992; Wills & Cleary, 1996). A person's perception

of support can be a mediating variable that affects how a person appraises as well as how that person is able to cope with stressful events in life. Procidano and Heller (1983) found that there were two factors that impacted the perception of social support: Life Events and Length of Time of Relationship. In a study of 222 college students (ages 19-21) the authors found the relationship between perceived social support and positive life events was weak (r=.09). The relationship between negative life events and perceived social support of friends (r = .17) was stronger than the relationship between positive life events and perceived social support of family (r=.05). The strongest relationship was between perceived social support of family (PSS-FA) and perceived social support of friends (PSS-FR) and Length of Time of the Relationship between perceiver and supporter (r=.43 & r=.33, respectively).

In regards to gender and PSS-FA, Windle and Windle (1996) surveyed a sample of 773 middle adolescents in Buffalo, New York, to determine relationships between coping responses, drinking motives, stressful life events, and problem behaviors by gender. They found that there was a weak relationship between gender and PSS-FA, r=.06. Further studies need to be done in the adolescent population to determine exactly what role PSS has as a potential mediator and what effect this can have on adolescent outcomes.

Family connectedness (social support) and school connectedness (possibly peer social support) has been shown to decrease health risk behaviors such as emotional distress, suicidal thoughts, violence, and substance abuse (Resnick, et al., 1997). However, per Wills and Cleary (1996) additional research needs to be completed to determine exactly what role mediating variables (such as perceived social support of

family and perceived social support of friends) plays in mediating the effects of life events on adolescent substance abuse (alcohol, drug use, and smoking).

3. Coping

Cognitive avoidance as a maladaptive coping skill has been found to be predictive of higher levels of distress when in the presence of a negative life event, such as a health crisis (Stanton & Snider, 1993). Symptoms of depression and anxiety can be viewed as predictable by products of a mismatch between life stressors (life events) and coping skills (DeNelsky & Boat, 1986). These deficits can manifest themselves in a variety of ways including: bullying, use of drugs and alcohol, and negative emotions of feelings (DeNelsky & Boat, 1986).

Adolescents suffering from depression are more likely to drink until they are drunk (King, Ghaziuddin, McGovern, Brand, Hill, & Naylor, 1996). They have also been found to be more likely to smoke cigarettes (Goodman & Capitman, 2000). Adolescents with depression are also more likely to have symptoms of anxiety (Kovacs, 1990; Korhonen, et al., 2002). Low social support, high stress, and maladaptive coping skills can put adolescents at greater risk for these poor psychosocial outcomes (Compas, Orosan, & Grant, 1993). In the presence of a stressor (threat or harm), confidence (optimism) predicted emotions better than coping; however, maladaptive coping was related to lack of use of social support and use of alcohol (Carver & Scheier, 1994).

D. Relationships Among Variables

1. Demographics, Stress, Psychosocial Factors, and Anxiety

Wren, Bridge, and Birmaher (2004) completed an anxiety screening study of predominately white (96.1%), children (n=236, girls=112), ages 8-12 years old (mean=10.54), from suburban and rural western Pennsylvania. They found that although parental reports of anxiety symptoms did not vary with demographics, younger female patients had greater excess in reporting of symptoms. This leads to the conclusion there is a relationship between gender and anxiety symptom report as well as age and anxiety symptom report. Anxiety screening may need to incorporate age and gender adjusted cut-off scores for determining a diagnosis of or the presence of anxiety. Continued studies of screening methods may be necessary in a variety of populations of children and adolescents to determine if this finding for females of a younger age over reporting of symptoms remains consistent throughout the lifespan. Morrison (1995) states in his overview of the DSM-IV that Anxiety related disorders such as 'Panic Disorder' and 'Social Phobia' initially present when the patient is young. In fact many of the anxiety disorders appear with greater frequency among women.

Anxiety can affect the way that someone views life events. It may cause negative assessment and result in responses with higher levels of fear when unnecessary (Velting et al, 2004). The combination of anxiety and dysthymia (chronic low mood) can affect an individual's perception of life events, causing something that may be a normative life event (one that happens to anyone) to become a more serious non-normative stressful life event (Harkness & Luther, 2001).

People with anxiety often use an avoidance/escape approach when coping with feared situations (Velting et al, 2004). The presence of anxiety and dysthymia can compromise an individual's coping resources (Harkness & Luther, 2001). These individuals are also at risk for decreased social functioning (including avoidance of others), which could impair social support.

a. Summary

It is important to continue to build on the knowledge that has been gained about anxiety as an outcome in an attempt to both properly diagnose and treat the growing number of children and adolescents that are impacted. This is especially true in rural adolescents who have a lack of access to mental health care due to both availability of services and economic constraints such as lack of health insurance or money. Researchers need to explore the relationships among the different variables (Specific Aim 2) and identify what factors identify an adolescent at risk for either developing or having a diagnosis of anxiety (Specific Aim 3). Further more, interventions need to be developed that are empirically based. Interventions developed to be available in the community, thereby allowing for inexpensive, available treatment. Prompt diagnosis and treatment may decrease the amount of co-morbid diagnoses already found linked to anxiety such as other mood disorders (e.g., depression) and substance abuse. This helps to ensure the future of these adolescents as individuals, as well as the future of our nation as a whole.

2. Demographics, Stress, Psychosocial Factors, and Depression

A gender difference in depressive symptoms has been noted to emerge during adolescence. In a sample of rural adolescents, grades 7-12 (n=451, f=236) studied over a period of six years, gender differences in depressive symptoms were found to begin around age 13 or 14 years of age (Ge, Elder, & Conger, 2001). Although small, this significant difference persisted across time (through mid to late adolescence). This implies that girls manifest higher symptoms of depression at an earlier age (Jacobson & Rowe, 1999; Hankin, Abramson, Moffitt, Silva, McGee, & Angell, 1998; Wichstrom, 1999; Nolen-Hoeksema & Girgus, 1994; Ge, Lorenz, Conger, Elder, & Simons, 1994). It also implies that there is a relationship present between gender, gender, and depression that can affect individual outcomes (Kuehner, 2003). A majority of other studies have also indicated that women also have high relapse and high non-remission rates (Keuhner, 2003). Also, there appears to be a predictive relationship between early manifestation of depressive symptoms and development of depressive symptoms later in life (Compas, Hinden, & Gerhardt, 1995; Nolen-Hoeksema, Girgus, & Seligman, 1992; Peterson, Sirigiani, & Kennedy, 1991; Susman, Dorn, & Chronusos, 1991; Ge et. al, 2001). Socioeconomic markers such as chronic poverty can also put adolescents at risk for developing negative outcomes such as depression (Compas, et. al., 1995). It also appears that there are not only differences in gender, but there may also be significant differences in presentation of depressive symptoms in adolescents dependent upon subjects not residing with both biological parents (Lewinsohn, Rohde, Seeley, Klein, & Gotlieb, 2003). This could also warrant further investigation into the presence of parents living in

the home and its effect on adolescent depression. Stressful life events can also increase the risk for developing depression. Depression is more commonly found in those with chronic illness or after experiencing recent stressful life events (Compas, et.al, 1995; Birmaher, et.al, 1996; Ge, et.al, 2001).

Closeness with parents, particularly fathers, has also appeared to have moderate effects on adolescent depressive affect (Peterson, et. al, 1991). Depression is related to maladaptive coping and poor peer and family relationships (Compas et. al, 1995). Among adolescents, less closeness or contact with peers can contribute to increases in depression (Vernberg, 1990). It can also impair cognitive functioning (i.e. optimism and coping skills) and social/interpersonal functioning variables such as social support from friends and family (Korhonen, Antikainn, Peiponen, Lehtonen, & Viinamaki, 2002; Lewinsohn, et al., 2003). With coping skills impaired, depressed adolescents who are pessimistic about the future may turn to maladaptive means to deal with their symptoms, this could include drug use, or even suicide. While girls are more likely to attempt suicide, boys are more likely to complete suicide. Rates of suicide for boys and girls were 14.6 and 2.9 per 100,000, respectively (Brent & Birmaher, 2002).

Studies have also begun to look at the differences in gender among rural adolescents and the risk of depression and problem behaviors such as anger and aggression in response to psychosocial stressors (Conger, Elder, Lorenz, Simons, & Whitbeck, 1992; Conger, Conger, Elder, Lorenz, Simons, & Whitbeck, 1993; Crick & Grotpeter, 1995; Crick, Bigbee, & Howes, 1996; Crick, 1997; Patterson, 2001), with findings indicating that gender is an issue in need of further examination. Gender is one of the demographic variables of interest in this secondary data analysis in an effort to

have a greater understanding of the relationship among gender and other variables such as anxiety, substance abuse, coping, optimism and stress (life events).

a. Summary

Studying adolescent depression in a variety of populations (different cultures and geographical locations) can lead to a greater understanding of this serious problem. The development of interventions such as the 'Teaching Kids to Cope' (TKC©), which addresses the lack of adaptive coping skills in today's youth (Puskar, Sereika, & Tusaie-Mumford, 2003), is one example of how empirical based interventions can be used in successfully in a community setting. Using research such as this secondary data analysis to determine the relationships among the variables (Specific Aim 2) will allow researchers to identify which variables influence the relationships the most (Specific Aim 3). This will allow the researcher to determine at what point in a given model introducing a successful intervention may be possible. These interventions can assist adolescents in preventing and/or decreasing depressive symptoms.

3. Demographics, Stress, Psychosocial Factors and Substance Abuse

Using data obtained from the Add Health Study (N=26,666), it was found that adolescents that work 20 hours or greater per week have a higher association with emotional distress and substance abuse (Resnick, Bearman, Blum, Bauman, Harris, Jones, Tabor, Beuhring, Siebing, Shew, Ireland, Bearinger, & Udry, 1997). Females who

have been diagnosed with Major Depressive Disorder also have a higher rate of tobacco use (Lewinsohn, Gotlieb, & Seely, 1995).

Substance abuse, such as smoking, is related to the development of affective disorders and an expectation of stress reduction (Baker, 2004). People with high negative affectivity are more likely to utilize substance abuse as a way to cope with life stress; however, there has not been sufficient studies including females to determine if there is any relationship between gender, negative affectivity, and stress and substance abuse (Shoal & Giancola, 2003).

Some factors that have been found to affect substance abuse include: family support, peer support, perception of risk, availability of the substance, and school performance (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Petraitis, Flay, Miller, Torpy, & Greiner, 1998; Schiffman, 2004). For example, in adolescents cited with underaged smoking violations, the ability to decrease or discontinue tobacco use was associated with a greater perception of parental concern and support (Langer, Warheit, & Torres, 2003)..

a. Summary

Research specifically targeting substance abuse is showing that there are many associations among the variables of substance abuse, demographic variables (such as adolescent job), stress, psychosocial factors such as family and peer support, and other mental health diagnoses (outcomes such as depression and anxiety) in both adult and adolescent populations. Further research needs to be completed to determine if there are gender differences with substance abuse and variables such as stress and negative

affectivity (which may be influenced by optimism level and/or mood such as depression) in order to develop effective interventions (Specific Aim 3). There also needs to be continued research within the adolescent population to determine if the same relationships/associations of variables holds true with rural adolescents (Specific Aim 2).

E. Conclusion

In conclusion, the relationships need to be clarified within the context of how they occur in rural adolescents. Many of these variables have been studied in adult populations and urban/suburban adolescents. The findings have shown relationships are present. Further study of rural adolescents is warranted to see if the same relationships occur in this population.

There also needs to be a greater understanding of what mediates these relationships. Gathering empirical data can assist in eventually developing a predictive model to identify which adolescents may be at risk for immediate or long-term effects. The empirical data a predictive model can then be used to develop interventions that can be successfully implemented to prevent or lessen the severity of poor outcomes (i.e., anxiety, depression, and substance abuse). For example, understanding the impact of coping styles can assist school and health care professionals (e.g., school nurse, advanced practice nurses in the community, etc.) in designing interventions to decrease negative outcomes (including those outcomes targeted in this secondary data analysis- anxiety, depression, and substance abuse) and poor behavioral choices (Patterson, 2001).

Specifically, populations that have previously been underserved by research or whom are at particular risk due to health disparities and lack of access to mental health

providers (i.e., rural adolescents) need to be studied. Having an accurate description of the population through studying samples such as the one in this secondary data analysis can assist in depicting an accurate picture of the rural adolescent population (Specific Aim 1). By studying this population, through examining the bivariate relationships among the variables proposed in this study (Specific Aim 2) and identifying which variables influence the relationships among demographics, stress, psychosocial factors, and outcomes (Specific Aim 3), complications that would normally occur later in the lives of these adolescents may eventually be able to be prevented.

Chapter 3

Methodology

A. Design

1. Primary Study

The primary study was entitled 'Intervention to Promote Mental Health in Rural Youth' (NINR, NIH Grant #R01 NR03616). The population consisted of adolescents attending high school in a rural county located in Western Pennsylvania. The county was designated rural by using the State of Pennsylvania's criteria (1996) for defining a county as rural based on socioeconomic/demographic information previously collected by the State. The convenience sample consisted of 624 rural adolescents ages 13-19 years. The study was conducted in two phases. The first phase was a descriptive, cross-sectional survey which evaluated the mental health of rural adolescents for life events, coping strategies, social support, optimism, anger, drug use, depressive symptoms, anxiety, and health concerns. The second phase was a quasi-experimental design that consisted of the testing of a cognitive behavioral psycho-educational intervention, Teaching Kids to Cope (TKC©). The theoretical framework for the parent study included developmental work by Erikson (1963) and Blos (1962), Lazarus' stress and coping model (Lazarus and Folkman, 1984), Cohen's stress buffering social support model (1983), and Beck's cognitive behavioral model (1976).

2. Secondary Data Analysis

The current study was a secondary analysis of the data collected in the study entitled Intervention to Promote Mental Health in Rural Youth' (NINR, NIH Grant #R01 NR03616). The design for this secondary study is a descriptive, cross-sectional survey

evaluating the mental health of the rural adolescents utilizing the data collected during the first phase of the primary study. The purpose of this secondary data analysis was to examine the relationships among demographic variables (age, gender, birth order, parents present in household, subject having a job), stress (life events), psychosocial factors (optimism, perceived social support, coping), and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents. The data used was cross-sectional, observational, baseline data obtained from the primary study. There was no manipulation of independent variables, no control group, and no randomization. The theoretical framework supporting the secondary analysis is based on Lazarus' Stress and Coping Model (1966) and Lerner's Developmental Contextualism (1987, 1995). The results from the secondary data analysis will be used to support future studies by developing community- and school-based interventions to identify and treat students who are at risk for or are already experiencing negative outcomes (e.g., anxiety, depression, and substance abuse) thereby decreasing the possibility of or lessening the development of long-term mental health disorders and their lasting effects.

Strengths of secondary data analysis include cost and length of time; both are decreased because the data has already been collected (Brink & Wood, 1998; Hulley & Cummings, 1988, p. 53). Limitations of the project include the fact that the selection of and the quality of the data, as well as the method of data entry and filing, have already been determined during the conducting of the primary study, which could result in problems with the accuracy of the data (Brink & Wood, 1998; Hulley & Cummings, 1988, p. 54). Also, the goals of the primary study are not the same as those of the

secondary data analysis study, so the data collected may not best support the aims of the secondary data analysis or the measurement of variables in the secondary study.

B. Sample

In phase one of the primary study, the population included adolescents, ages 13 to 19 years old from four rural high schools located in western Pennsylvania. The convenience sample consisted of boys and girls in 9th through 12th grade (N=624) who volunteered to participate in the study. Inclusion criteria in the primary study consisted of: 1) age 13-18; 2) being enrolled in a regular, college preparatory, or honor academic curriculum; and 3) being able to read and write in English. The inclusion criteria age was set so the sample would be representative of adolescents in high school. Inclusion criteria 2 and 3 were necessary because data was collected using self-report instruments. Subjects needed to have a command of the English language and be able to read, interpret, and answer questions with minimal guidance. Exclusionary criteria included: 1) being enrolled in courses for socially and/or emotionally disturbed students and 2) the loss of a parent/caregiver or close friend in the 12 months prior to the study. This exclusion criterion was set to prevent bias in the sample with subjects who may have depressive symptoms and not be representative of the average adolescent. Informed consent was obtained from each of the subjects and a parent or caregiver who lived with the student.

Subjects (n=624) were mostly female (60.3%) and Caucasian (97.1%). The mean age of the sample was 15.85 years (range= 14.05 to 19.82, SD=0.99). A majority of subjects participated in the regular academic curriculum (84.5%) and were enrolled in the 9th grade (40.1%). Most subjects were first born or only children (43.9%) and the

majority of subjects lived with their biological mother (93.2%) and 68.7% lived with both biological parents.

In the secondary data analysis, the sample size was limited to the 466 subjects, those who completed the instrument measuring anxiety (Screen for Child Anxiety Related Disorders) at baseline as well as the instruments measuring stress (life events), coping, optimism, perceived social support, depression, and substance use. Anxiety is one of the outcome variables of interest in the secondary data analysis.

Subjects were mostly female (60.9%) and Caucasian (97.2%). The mean age of the sample was 15.88 years (range= 14.05 to 19.82, SD=1.02). A majority of subjects participated in the regular academic curriculum (91.2%) and were enrolled in the 9^{th} grade (42.3%). Most subjects were first born or only children (41.1%) and the majority of subjects lived with their biological mother (92.8%) and 76.2% living with their biological fathers.

C. Setting

The setting for the primary study was four rural high schools in Western Pennsylvania. Each of the four schools met criteria for rurality (i.e., a population of fewer than 25,000) as each community contained $\leq$ 7100 people, with < 2,500 people per square mile. The average family income was $25,000 per year.

D. Data Collection Procedures

Psychiatric clinical nurse specialists, including the principal investigator, project director, and the project team members, collected the data from the subjects. The paper and pencil, self-report surveys were given to the subjects in a group setting monitored by the research team. Data collection took place during a pre-scheduled, 90 minute time

period during the regular school day. Parental consent forms specified that parents could not have access to the students' scores. Each student received a payment of $10.00 upon the completion of the 11 surveys measuring physical and mental health. The survey instruments used in the primary study included: the State-Trait Anger Expression Inventory (STAXI), Reynolds Adolescent Depression Scale (RADS), Coping Responses Inventory Youth Form (CRI-Y), Perceived Social Support Scale (PSS), Drug Use Screening Inventory (DUSI), Youth Self Report Scale of the Child Behavioral Checklist (YSR-CBCL), Life Orientation Test (LOT), Screen for Child Anxiety Related Disorders (SCARED), Life Events Checklist (LEC), Adolescent Health Inventory (AHI), and the investigator-developed demographic profile form.

E. Instrumentation

For the secondary data analysis, only the survey instruments that correspond with the variables of interest were used. These variables included: life events, coping, perceived social support, optimism, depression, anxiety, and substance use (alcohol, drugs, smoking). Data were obtained from the following instruments: Life Events Checklist (LEC), Coping Responses Inventory Youth Form (CRI-Y), Perceived Social Support Scale (PSS), Life Orientation Test (LOT), Screen for Child Anxiety Related Disorders (SCARED), Reynolds Adolescent Depression Scale (RADS), Drug Use Screening Inventory (DUSI), Adolescent Health Inventory (AHI), and the investigator-developed demographic profile form. Internal consistency of the instruments was examined by using SPSS 13.0 to calculate Cronbach's alpha. These instruments are described in detail in this section.

1. Life Events Checklist

Life Events Checklist (LEC) is a self-report scale that measures life events, both positive and negative, in older children and adolescents (Johnson & McCutcheon, 1980). It consists of 46 items plus four additional spaces for subjects to write in significant events experienced by the subject but not listed on the scale. The LEC yields three values: a positive life change score, a negative life change score, and a total life change score. The positive life events effect score is derived by adding the impact ratings (0 to 3) of the events that are rated as positive. The negative life event effect score is derived by summing the impact ratings (0 to 3) of the events that are rated as negative. It is also possible to compute negative and positive life change scores by adding the number of negative and positive events, without regard to their respective impact ratings. Normative data obtained by Johnson and McCutcheon (1980) demonstrated that these unit values were as predictive of dependent measures as were the impact rated scores. Test-retest reliability of the LEC has been reported in non-rural subjects (n=50) ages 10-17 that were given the LEC and re-tested after a two-week interval. Test-retest correlation for positive life change scores was .69 and for negative life change scores was .72 (Brand & Johnson, 1982). The authors of the instrument used test re-test correlations as a test of reliability. Several items on the survey are gender-specific and would not necessarily be filled out by a given subject. The reliability for this instrument could not be calculated using the author's method of test re-test correlation because the data is cross-sectional.

2. The Coping Responses Inventory - Youth Form

The Coping Responses Inventory - Youth Form (CRI-Y) is a 48-item instrument that assesses how adolescents age 12-18 years cope with a variety of stressful life events (Moos, 1993). The CRI-Y can be administered as a structured interview or as self-report, individually or in a group setting. In the parent study, the CRI-Y was administered as a self-report instrument in a group setting. The subject is asked to score each item (situation) on a 4 point scale from 1 (not at all) to 4 (fairly often). The CRI-Y is composed of four approach coping subscales including: Logical Analysis, Positive Reappraisal, Seeking Guidance and Support, and Problem Solving. It also includes four avoidance coping subscales: Cognitive Avoidance, Resignation or Acceptance, Seeking Alternative Rewards, and Emotional Discharge. The instrument measures the different types of behavioral and cognitive efforts directed at managing a stressful situation and/or its aftermath. Each specific subscale yields a score ranging from 6 to 24. There is also a general summary score measuring approach strategies and one that measures avoidance strategies. Coping was examined in this secondary analysis using approach coping and avoidance coping. Approach coping was created by summing the four approach subscale scores and taking the mean of the scores. Avoidance coping was then created with the same method applied to the four avoidance subscale scores. Any subject not having a score on a subscale was deleted.

The content, construct, and face validity of the CRI-Y are based on reviews of the literature, item selection criteria, interviews and clinical reports of referred teenagers. The CRI-Y has been used with over 400 adolescents (male and female) in various contexts (healthy, depressed, and chronically ill). Alpha coefficients among the subscales

ranged from .69 to .79 (Moos, 1993). Indices of stability (r) over a 12-month interval ranged from .34 to .46. The Cronbach's alpha for approach coping for the rural adolescent sample in this study was estimated as .88 (n=414) and for avoidance coping was .86 (n=410).

3. Perceived Social Support Friend and Family

Perceived Social Support is a 40-item self-report scale composed of two subscales (PSS-FR and PSS-FA) having 20 items each. Each subscale measures both close and diffuse social support. It has been widely used with adolescent and adult populations to determine a subject's perception of social support from family and friends. The range of scores for each item is 0 to 1. The higher the individual's score on the scale, the greater the perceived social support. Each subscale has its own score (0 to 20). There is no total Perceived Social Support score combining both subscales. The PSS scale was utilized in a study with 244 high school age students. The PSS scale was also utilized in a study of 222 college students, mean age 19 years (Procidano & Heller, 1983). Cronbach's alpha for the family subscale was .88 and for the friends subscale, .90. The internal consistency as estimated by Cronbach's alpha for the rural adolescent sample was .86 (n=452) for the family subscale and .80 (n=454) for the friend subscale.

4. Life Orientation Test

The Life Orientation Test designed by Scheier and Carver (1992) measures optimism by assessing generalized outcome expectancies of individuals. The scale consists of 12 items: 4 statements that solicit positive connotations, 4 statements that illicit negative

connotation, and 4 statements which do not pertain to outcome expectancies but are filler items. Each item is scaled on a 5-point Likert scale with responses ranging from strongly agree to strongly disagree. Scoring is done by reversing the responses on the negative statements and then adding all responses together. Test-retest reliability based on a sample of 142 who completed the LOT on two separate occasions was .79. For the primary study, a revised version of the LOT, the LOT-R was utilized. It consists of 10 items, four of which are fillers. It also scores each item on a 5-point Likert scale with responses ranging from strongly agree to strongly disagree. The scoring of the LOT-R is done the same as the LOT. Scores can range from 0 to 40. The LOT-R was tested for convergent and discriminate validity and it was found that correlations between the LOT-R and other instruments that measured neuroticism, self-esteem, self-mastery, and anxiety, supported that the LOT and the LOT-R were similar in characteristics (Scheier, Carver, & Bridges, 1994). Cronbach's alpha in a sample of 2,055 college students for the six items measuring optimism and pessimism was .78 (Scheier, et. al, 1994). Inter-item correlations were .43 to .63. Test - retest reliability in college students, over an interval of 4 months, ranged from .58 to .79 (Scheier et. al, 1994). The Cronbach's alpha for the rural adolescent sample in this study was estimated at .59 (n=459).

5. Self-Report for Child Anxiety Related Disorders

The Self Report for Child Anxiety Related Disorders (SCARED) developed by Birmaher, Khetarpal, Brent, Cully, Balach, Kaufman, and Neer (1997) is a self-report survey designed to screen children and adolescents for anxiety disorders. The instrument consists of 38 statements related to common anxiety symptoms. Items are scored on a 3-

point Likert response range. Six scores are computed, a total score and separate scores for each of the five factors: somatic/panic, general anxiety, separation anxiety, social phobia, and school phobia. A score of 25 or above is the cut-off score for anxiety disorders on the total scores. (Each of the subscales has a cutoff value.) For both the total anxiety score and each of the five factors, the SCARED demonstrated good internal consistency (Cronbach's alpha ranged from .74 to .93), and test-retest reliability (ranged from .70 to .90). The Cronbach's alpha for the rural adolescent sample in this study was calculated using SPSS 13.0. It was .91 (n=456).

6. The Reynolds Adolescent Depression Scale

The Reynolds Adolescent Depression Scale (RADS) is a self-report instrument used to measure depressive symptoms in adolescents (Reynolds, 1987). The RADS consists of 30 items with a 4-point Likert response format. The adolescent responds to each item by endorsing the response that best indicates how she or he usually feels. In scoring the RADS, responses are weighted from 1 to 4 points in the direction of pathology. The lowest score is 30; the highest is120. There are 6 critical items (6, 14, 20, 26, 29, and 30) evaluating serious symptoms like social withdrawal, self- injurious behavior, self-deprecation, worry, appetite disturbance, and helplessness. There are seven items that are reverse scored (1, 5, 10, 12, 23, 25, and 29). People administering the test can check for inconsistency subject's answers by checking items '1 and 7' and '9 and 12' for potential invalid responding (Reynolds, 1987). Scores of 77 or above indicate significant depressive symptoms, while scores of 66-76 indicates some depressive symptoms. In a sample of over 2000 adolescents, internal consistency and split-half

reliabilities were high .91 and .96, respectively; test-retest reliability over 6 weeks, 3 months, and one year ranged from .63 to .80 (Reynolds, 1987). However, over 12 months the mean difference in scores decreased significantly (Reynolds, 1987). The Cronbach's alpha for the rural adolescent sample in this study was estimated as .90 (n=437).

7. Drug Use Screening Inventory

Drug Use Screening Inventory (DUSI) is a 149-item questionnaire, which quantifies severity of drug and alcohol use in adolescents (Tartar, 1990). It looks at substance use, patterns of behavior, health status, psychiatric disorder, social competence, family system, school adjustment, work adjustment, peer relationships, and leisure/recreational use (Kirisci, Mezzich, & Tarter, 1995). Average internal reliability across the 10 domains was found to be .74 for males and .78 for females (Kirisci, Mezzich, & Tarter, 1995). Test-retest reliability averaged .95 for males and .88 for females (Kirisci, Mezzich, & Tarter, 1995). The instrument is able to classify correctly between 80% to 97% of individuals who are normal, and 68% to 86% of adolescents who qualify for a psychoactive substance use disorder (Kirisci, Mezzich, & Tarter, 1995). The Cronbach's alpha for the rural adolescent sample in this study was estimated as .71 (n=449).

For the purpose of this secondary analysis, item #1 on the first section of the DUSI, which evaluates drug use and frequency, was used to calculate alcohol abuse. Drug abuse was calculated using SPSS 13.0 and collapsing the data from section one items #2 through #9 on the DUSI. Item #10, 'other drug' was eliminated from the computation this variable due a large amount of missing data (> 10%) for the item. If a

subject indicated that they had used any of the drugs listed on items # 2-#9 at least once, then drug = yes.

8. Adolescent Health Inventory

The Adolescent Health Inventory (AHI) is used to report the needs and concerns of adolescents in relation to general health, psychosocial issues, and risk behaviors (Nelson, Barnard, King, Hassanein, & Rapoff, 1991). Initially the instrument was 36 items developed from an extensive background review. Then content validity was determined by expert evaluation. A convenience sample of middle class, urban, high school students in the Midwest (n=219) was used to test reliability. The subjects had the instrument administered during their regular school health class. The AHI was then revised to 39 items and was administered to a similar sample of adolescents at two separate times (n=50). Internal consistence Cronbach's alpha values ranged from .519 to .802 (Nelson, et. al, 1991). Pearson's correlations values for test-retest ranged from .309 to .860 with > 50% being above .70 (Nelson, et. al, 1991). Percent agreement ranged from 63.39% to 100% (mean=81.92%) (Nelson, et. al, 1991). The Cronbach's alpha for the rural adolescent sample in this study was estimated as .82 (n=442). For the purpose of the secondary study, only item #32 from this instrument will be used. That item specifically addresses the presence of and frequency of substance use (smoking cigarettes).

9. Investigator-Developed Demographic Profile Form

The investigator-developed demographic profile form was used to obtain information on the characteristics of each subject such as age, race, grade, gender,

academic curriculum, job history, transportation to school, family members in the home, number of siblings, birth order, desire to speak with someone immediately related to any issues, and recent death (with in past year) of any family member or close friend. For the purpose of the secondary data analysis, only characteristics such as age, gender, birth order, parents present in household, and job, will be considered.

F. Protection of Human Subjects

1. Human/Animal Subjects Protection

As a secondary data analysis of de-identified data, the research presents minimal risk to the involved children. For the secondary data analysis, all data were de-identified by an honest broker supplied by the University of Pittsburgh, School of Nursing.

The primary study followed the requirements of and obtained the approval of the University of Pittsburgh IRB. The investigators used the standard forms and/or procedures that have been established by the IRB (i.e., Consent forms for subjects and parents). The yearly IRB renewal for the primary study also included a summary report of the data and safety monitoring plan findings each year during the study. The data and safety monitoring plan was used to ensure that there were no changes in the risk/benefit ratio during the course of the study and that confidentiality of research data was maintained. Confidentiality was maintained by using code numbers and not subjects' names. All data were kept in a locked filing cabinet or in a coded data set (secured in the computer) at the School of Nursing for at least 5 years, or as long as it is in use.

There were no animals included as subjects in the parent study.

G . Data Analysis

1. Data Screening and Cleaning

The data were screened using SPSS 13.0 for Windows (SPSS, 2004). Screening included: checking the data for accuracy; detecting outliers and extreme values; evaluating and treating any missing data; and evaluating for the violation of underlying assumptions (e.g., normality, linearity, and homoscedasticity).

a. Checking Data Accuracy

Accuracy was evaluated by visually examining the database and by using univariate descriptive statistics to detect any inconsistencies in data entry or coding. No inconsistencies were noted. Frequencies and histograms were also used to visually assess the data. Continuous variables were checked to be sure that all variables had values within range and with realistic means and standard deviations. Discrete variables were checked to see if there are any numbers out of range. Examination of the statistics did not identify any inconsistencies in data entry or data coding.

b. Detecting Outliers and Extreme Values

Outliers were examined for on a case-by-case basis for plausibility and importance based on the criteria of reasonableness, given knowledge of the variable, response extremeness, and predictor extremeness. Those subjects with scores on the instruments >/= 3 standard deviations from the mean, as identified by z-score statistics, were evaluated on a case-by-case basis. Univariate outliers were found to be representative of the variability in the scales and deemed an accurate representation of the

sample. Scores did not appear to be the result of inaccurate data recording or coding. One case was identified as a univariate outlier on the variable age and was listed as 19.82 years. A single sample t-test comparing the mean of age with the outlier (15.89, SD=1.02) and the mean of age without the outlier (15.88, SD=1.00) showed that there was no significant difference in the mean of the variable age with the outlier excluded ($t(464) = -.165$, $p>.05$). Also, skewness and kurtosis were evaluated and were found to be within expected value, they were reasonably close to zero with no significant change in either with the case having the age of 19.82 left in the data set. Although the parent study had criteria set of subjects being aged 18, realistically, subjects in high school may have ages 1-2 years outside of the parent study's age inclusion/exclusion criteria. This may be related to starting school earlier or later than usual, sickness, repeating a grade, etc. To exclude such cases may not give a true representation of the sample population. This case is thought to be representative of the sample and potentially the population, and so was left in. When comparing the sample with and/or without this case, there was not a statistically significant difference found in the mean or the normality of the distribution of age by removing the case. Thus, the case was left in the sample for the remainder of the data analysis.

Mahalanobis distance was used to evaluate multivariate outliers. There were 10 subjects identified as multivariate outliers. These were also evaluated on a case-by-case basis. The majority of these cases were identified because of not having a female adult or mother living in the home and having answered to being born a 5^{th} child (or higher) in the birth order. One case also had a score of zero on their avoidance coping score. However, these cases were not removed from the sample. Although they appeared to deviate from

the majority of the sample in their self-report on these items, they were found to be representative of the sample variability and were thought to be important in accurately representing the sample of rural adolescents screened in the parent study.

c. Treating Missing Data

Missing data was identified through multivariate analysis (MVA) using SPSS 13.0. The pattern of missingness was evaluated to determine how much data is missing and why. The amount of data missing was also examined through the use of frequency statistics. All subjects and variables had <5% missing data. The type of missingness (missing completely at random (MCAR), missing at random (MAR) or ignorable missingness, and nonignorable missingness) was assessed between subjects and within a given subject. Expectation maximization (EM) was used to create a missing data correlation matrix. It is the simplest and most reasonable approach because it avoids 'over fit' and produces a realistic value (Tabachnick & Fidell, 2001) when used to impute data.

Utilizing EM, Little's MCAR test resulted in a Chi-Square= 80.41 (df=64, p=.081) showing that there was no significant deviation from a pattern of values that are missing completely at random. The conclusion was drawn that the data was found to be most likely missing completely at random (MCAR) and scattered throughout the data set, deletion may cause a loss of subjects that would affect results. There was also statistical support, Little's MCAR, for using the EM algorithm for imputation of the missing values (Tabachnick & Fidell, 2001). This was completed and the remaining data analysis was

done using the data set with imputed values. This increased the valid sample size (listwise) from 416 to 439.

d. Evaluating the Underlying Assumptions

For evaluating for any violation of underlying assumptions of normality, linearity, and homoscedasticity, SPSS 13.0 was used (SPSS, 2004). Any violation of the assumption of normality was assessed using SPSS descriptive statistics, frequency histograms with normal distribution overlay, and examining the distribution of residuals. Test statistics such as Kolmogorov-Smirnov were utilized as well as visually assessing the shape of the plot (expected normal probability plots). Linearity was assessed looking at skewness and using bivariate scatterplots to screen pairs that look non-linear. Normality was also evaluated for each variable by looking at the skewness and kurtosis presence and magnitude. Non-normality was found across all variables to some extent. The sample size is large (n=466) and the distribution of the means is expected to be normal; however, a large sample size yields high power and a small deviation from normality can be found to be significant. Thus, there was a focus on graphical assessments rather than inferential assessments to assess normality. Those independent variables with moderate to severe skewness and kurtosis (>3, <-3) from zero when using the z distribution, or any variables with a violation of the underlying assumptions was considered for possible data transformation (e.g., square root transformation, log transformation, or dichotomizing the variable) to improve analysis. One variable was improved for both skewness and kurtosis through square root transformation, number of bad items (Stress-Life Events Checklist). The number of bad events was severely skewed and had severe positive kurtosis (z-scores=12.66 and 12.20 respectively). This was

visually apparent when examining the histogram with normal curve as well. Square Root Transformation was completed and the variable appeared to approach normality with improvements in both skewness and kurtosis. The other variables identified were found to be no closer to normality through transformation.

Multicollinearity among predictor variables was evaluated through use of Pearson's product moment correlation and collinearity diagnostics. No correlations between any of the variables was greater that .70. Although there was one instance where the Condition Index was >30, the Variance Inflation Factor was <10 and the Tolerance was <1. Therefore, it is assumed that there was no serious multicollinearity present.

2. Adequacy of Sample Size

For multiple regression analysis, assuming a medium size relationship between the independent variables and the dependent variables, α=.05 and β=.20 for regression sample size of N>/= 50 +8 (number of independent or predictor variables) and N>/= 104 + (number of independent or predictor variables) when testing for individual predictors (Tabachnick & Fidell, 2001). If testing for overall correlation, both are calculated and the larger number is chosen for the minimum sample size. Estimated adequate sample size for this secondary data analysis, with 15 possible independent or predictor variables, is approximately 170 subjects. Utilizing PASS, a statistical software application that estimates adequate sample size, a sample of 129 subjects each responding to 15 items achieves 80% power to detect the difference between the coefficient alpha under the null hypothesis of 0.00 and the coefficient alpha under the alternative hypothesis of 0.30 using a two-sided F-test with a significance level of 0.05 (Bonett, 2002; Feldt, Woodruff, & Salih, 1987). Thus the sample size of 466 is adequate for this secondary study.

3. Descriptive Statistics

The data was analyzed using SPSS 13.0 (2004). This preliminary analysis included descriptive statistics and exploratory data analysis including frequency distributions and histograms to: determine that all underlying statistical assumptions are adequately satisfied; assess for the presence of outliers; and evaluate and determine the treatment (if necessary) for any missing data. Descriptive statistics allowed for characterization of the sample (Specific Aim 1).

4. Correlations

Parametric and/or non-parametric correlations, such as Pearson's product moment correlation and Spearman's rank-order correlation were computed to examine the bivariate relationships among demographic variables (age, gender, birth order, parents present in household, subject having a job), stress (life events), psychosocial factors (optimism, perceived social support, coping), and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents (Specific Aim 2). Statistical significance of these relationships was examined using t-test statistics. Relationships between discrete (categorical) variables were examined using Chi-Squared test of independence.

5. Regression

Regression analysis was used to examine the mediating role of stress and psychosocial factors to explain the relationship between the demographic variables (age, gender, birth order, parents present in household, subject having a job) and the outcomes

of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents (Specific Aim 3). Direct relationships and mediation (hypotheses 1.1 through 1.9) were examined using Wright's method of calculating direct and indirect effects (as cited by Norris, 2001).

Chapter 4

Results

A. Descriptive Statistics

Aim 1: Explore and describe the characteristics of the sample

1. Predictor Variables

a. Demographics (Table 1).

Subjects were mostly female (60.9%). The mean age of the sample was 15.89 years (range= 14.05 to 19.82, SD=1.02). Most subjects were first born or only children (41.1%) and the majority of subjects lived with their mother (92.8%) and/or with their fathers (85.2%). Mother/father could be natural, step, or foster. For the purpose of this analysis, the data was collapsed and the item was made dichotomous (yes/no).

Table 1

Sample Demographics (N=466)

Characteristic	n	%
Gender		
Male	182	39.10
Female	284	60.90
Birth Order		
Only Child	40	8.60
1st	151	32.40
2nd	166	35.60
3rd	70	15.00
4th	21	4.50
5th	13	2.80
6th	3	.60
7th	1	.20
Parents present in household		
Father= yes	397	85.20
Mother= yes	434	93.10
Subject having a job = yes	121	26.10

2. Potential Mediating Variables

a. Stress and Psychosocial Variables (Table 2)

Subjects reported having approximately 4 good life events and 3 bad life events with a slightly larger, moderate negative life event effect than positive life event effect. Top good events reported were: 1) making the honor roll and 2) having a new boyfriend/girlfriend. Top bad events reported were: 1) serious illness of a family member during the past 12 months and 2) death of a family member during the past 12 months. Optimism mean score was 12.99 (n=466, SD=0.159), with higher scores indicate higher levels of optimism (Scheier, Carver, & Bridges, 1994). Perceived Social Support of Friends was reported at a higher level than Perceived Social Support of Family. A larger approach coping score was reported than avoidance coping was reported for the rural adolescent sample in this secondary data analysis. This suggests that rural adolescents may be utilizing approach coping more often than avoidance coping.

Table 2

Potential Mediating Variables

Variables	n	Mean	Median	SD	Semi-quartile Range	Range	Possible Range
Life Events							
Number of Good Events	466	3.68	4.00	2.71	1.75-5.00	0.00-16.00	
Number of Bad Life Events	466	2.93	2.00	0.13	1.00-4.00	0.00-17.00	
SQRT # Bad Life Events	466	1.42	1.41	0.96	1.00-2.00	0.00-4.12	0.00-6.78
Negative life event effect score	466	1.35	1.50	0.98	0.00-2.00	0.00-3.00	0.00-3.00
Positive life event effect score	466	1.34	1.45	0.96	0.40-2.00	0.00-3.00	0.00-3.00
Optimism	466	12.99	13.00	0.16	11.00-16.00	2.00-24.00	0.00-40.00
Perceived Social Support							
Family	464	10.52	11.00	6.02	6.00-16.00	0.00-20.00	0.00-20.00
Friend	465	12.05	12.50	5.04	8.00-16.00	0.00-20.00	0.00-20.00
Coping							
Approach	451	8.27	8.25	3.51	6.00-10.60	0.00-17.00	0.00-24.00
Avoidance	447	7.98	8.00	3.33	5.75-10.50	0.00-15.75	0.00-24.00

Note. SD=standard deviation.

3. Outcomes

a. Anxiety, Depression, and Substance Abuse (Table 3)

For the SCARED, a score of 25 or above is the cut-off score for anxiety disorders on the total score. The subjects in this sample had a mean score of 16.39 (n=466, SD=10.24). Approximately 20% of the students surveyed scored 25 or above, indicating that they may meet the criteria for having an anxiety disorder according to the cut-off score set by the authors of the instrument.

The mean score for the RADS was 57.70 (n=466, std=15.79). Using the cut off scores suggested by Reynolds (1987), scores of 77 or above are indicative of significant symptoms of depression, while scores of 66 through 76 are indicative of some symptoms of depression. In this rural adolescent sample, approximately 11% of the subjects scored within the range of having significant symptoms of depression. An additional 21%-22% scored within the range indicating the presence of some depressive symptoms.

The outcome of substance abuse consists of three categories: alcohol, drug, and smoking cigarettes. Approximately 74% of the students (n=348) have used alcohol at least once. Of the 466 students in the study, 248 (53.2%) have, at some point, used at least one other drug such as: cocaine, marijuana, stimulants, LSD, tranquilizers, pain killers, heroin/opiates, PCP, and sniffing gas/fumes. Over 38% of subjects reported smoking cigarettes at least 'occasionally'.

In order to maintain consistency within the outcome of substance abuse, the variables of alcohol and smoking were also recalculated to be discrete variables (i.e., alcohol [yes/no], smoking [yes/no]). These discrete variables will be used for the remainder of the data analysis, (see table 3).

Table 3

Outcome Variables (n=466)

Outcome Variables	n	%	Mean	Standard Deviation	Range
Anxiety			16.39	10.24	0.00-54.00
Score >/=25	95	20.40			
Depression			57.50	15.79	30.00-106.00
Score >/=77	53	11.40			
66 </=Score</=76	100	21.50			
Substance Abuse					
Alcohol					
0 times	118	25.30			
1-2 Times	124	26.60			
3-9 times	117	25.10			
10-20 times	39	8.40			
>20times	68	14.60			
Smoking					
Never	286	61.40			
Occasionally	85	18.20			
Often	28	6.00			
Always	67	14.40			
Alcohol Abuse	348	74.40			
Drugs Abuse	248	53.20			
Smoking	180	38.60			

B. Correlations (Table 4 and 5)

Aim 2: Examine the bivariate relationships among demographic variables (age, gender, birth order, parents present in household, subject having a job), stress (life events), psychosocial factors (optimism, perceived social support, coping), and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescent.

The outcomes of anxiety and depression were significantly negatively related to gender. With anxiety and gender, a moderate negative correlation ($r = -.397$, $p < .01$) was found. This correlation suggests that females are reporting more anxiety symptoms than males. A similar relationship was observed between gender and depression ($r = -.279$, $p < .01$) indicating that females are reporting more depressive symptoms than males.

For substance abuse, a significant weak relationship was found with age and alcohol ($r = .1\ 40$, $p < .01$), suggesting that subjects reported alcohol use increases with age. The use of drugs (cocaine, marijuana, stimulants, LSD, tranquilizers, pain killers, heroin/opiates, PCP, and/or sniffing gas/fumes) was significantly related to parents in the household; both adult female in the house ($n=459$, $\chi^2 = 7.26$, $df=1$, $p = .01$) and adult male in the house ($n=446$, $\chi^2 =4.74$, $df=1$, $p < .05$). Of those subjects who had an adult female (natural, step, or foster mother) living in the house with them reported only 51.4% reported using at least one drug, compared to the 86.7% of the subjects who did not have an adult female living in the house and reported using at least one drug. For subjects reporting living with an adult male in the house (natural, step, or foster), only 50.9% reported using at least one drug compared to 67.3% of subjects without an adult male living in the house.

Age and parents present in the household were not significantly related to stress (life events). Gender had a weak, but significant relationship to the number of good events reported ($r = -.112$, $p < .05$), number of bad events ($r = -.139$, $p < .01$), and negative life event effect ($r = -.233$, $p < .01$). This indicated that females in the sample reported a higher number of good and bad life events and a greater negative life event effect than males in the sample. Birth order had a weak negative relationship with number of good events ($r = -.119$, $p < .05$) indicating that as birth order increases, a fewer number of good events is reported (e.g., a subject reporting being 3rd born may report a fewer number of good events than a subject who is 1st born). A subject having a job was weakly, but significantly related to the number of bad events ($r = -.100$, $p < .05$) and positive life event effect ($r = -.126$, $p < .01$). This indicates that subjects who have a job report fewer bad events and less of a positive effect of life events than are reported.

Age and parents present in the household were not significantly related to psychosocial factors. There is a significant, moderate negative correlation with gender and perceived social support of friends ($r = -.387$, $p<.01$), gender and approach coping ($r = -.261$, $p<.01$), and gender and avoidance coping ($r = -.279$, $p<.01$). Females in the sample reported higher levels of perceived social support from friends. They also endorsed using both approach coping and avoidance coping more often than males in the sample did. Birth order was significantly negatively related, though weakly correlated with both approach coping ($r = -.151$, $p<.05$) and avoidance coping ($r = -.183$, $p<.05$). Subjects born later into families (i.e., higher birth order) report less use of coping skills than do subjects born earlier into families (i.e., lower birth order). Having a job was significantly positively, weakly correlated to both optimism ($r = .095$, $p < .05$) and perceived social support of family ($r = .109$, $p < .05$). Subjects who had a job had a

higher score on the optimism instrument and reported a higher level of perceived social support from their families than subjects that did not work.

There was a significant negative relationship and moderate correlation between optimism and both anxiety and depression ($r = -.541$, $p < .01$; $r = -.296$, $p < .01$, respectively). Subjects reporting higher optimism scores reported lower anxiety and depression scores. Optimism also had significant negative, weak correlations with alcohol, drugs, and smoking ($r = -.175$ to $-.227$, $p < .01$). Subjects in the sample who had higher optimism scores reported less substance abuse.

Perceived social support of family was significantly negatively related to and moderately correlated with depressive symptoms ($r = -.401$, $p < .01$) and had significant negative, weak correlations with alcohol, drugs, and smoking ($r = -.175$ to $-.229$, $p < .01$). Perceived social support of friends was significantly negatively related and weakly correlated with depression ($r = -.167$, $p < .01$) and was not significantly related to substance abuse. Perceived social support was not significantly related to anxiety, indicating that perception of social support does not impact anxiety symptoms. These findings also indicate subjects with higher perceived social support of family scores report less depressive symptoms and less substance abuse. Subjects with higher friend support also reported less depressive symptoms; however, the correlation between family support and depressive symptoms was stronger.

Approach coping was significantly related and weakly positively correlated with anxiety ($r = .222$, $p < .01$) and was not significantly related to depression scores. Avoidance coping was significantly positively related to and moderately correlated with both anxiety and depression scores ($r = .358$, $p < .01$ and $r = .384$, $p < .01$, respectively). As avoidance coping scores increased for subjects, so did their reporting of anxiety and depression symptoms.

Avoidance coping was significantly positively related to substance abuse (alcohol, drugs, smoking) ($r = .138$-$.172$, $p < .01$). As avoidance coping scores increased, so did the reported use of alcohol, drugs, and smoking cigarettes.

The number of bad events and negative life event effect were both significantly related to and moderately positively correlated with depression ($r = .383$, $p < .01$ and $r = .274$, $p < .01$, respectively). Subjects reporting a larger number of bad events and a greater effect of negative life events also reported more depressive symptoms.

Anxiety was significantly positively related to and weakly correlated with all 4 variables representing stress (life events); number of good events ($r = .110$, $p < .05$), the number of bad events ($r = .253$, $p < .01$), negative life event effect ($r = .224$, $p < .01$), positive life event effect ($r = .015$, $p < .05$). These findings suggest that a relationship between subjects reported anxiety symptoms and any type of stress/ life event exists. However, there is a stronger correlation with anxiety and the number of bad events and their effects.

Number of good events was significantly positively related and weakly correlated with optimism, perceived social support of friends, and approach coping ($r = .125$ to $.155$, $p < .01$). Subjects who reported higher level of optimism, greater perceived social support of friends and greater use of approach coping skills also reported a greater number of good events occurring.

The number of bad events was significantly negatively related to optimism ($r = -.225$, $p < .01$) and perceived social support of family ($r = -.222$, $p < .01$). A significant, positive correlation between the number of bad events and avoidance coping ($r = .238$, $p < .01$) was also found. Subjects who report a greater number of bad events occurring also report lower perceived social support of family, lower scores on the optimism, and greater utilization of avoidance coping skills.

Negative life event effect was significantly negatively related to, but weakly correlated to optimism ($r = -.135$, $p < .01$). It was, however, positively related and weakly correlated to PSS-FR, approach coping, and avoidance coping ($r = .120$ to $.246$, $p < .01$). The highest correlation was between negative life event affect and avoidance coping showing that subjects who report a greater negative effect on their lives due to life events also report utilizing avoidance coping skills more often.

Positive life event effect was weakly correlated, but significantly positively related to perceived social support of friends, approach coping, and avoidance coping ($r = .101$, $p < .05$; $r = .187$, $p < .01$; $r = .117$, $p < .05$, respectively). Subjects reporting a greater positive affect of life events also report greater perceived social support from friends as well as greater utilization of both approach and avoidance coping skills.

In summary, there were several statistically significant relationships noted between the variables. In particular, gender (female) was negatively related to reported anxiety and depressive symptoms. Number of bad life events was positively related to all outcomes. Optimism and perceived social support of family were negatively related to all outcomes. Perceived social support of friends was negatively related to depressive symptoms. Avoidance coping was positively related to all outcomes. These findings indicate that: 1) there are gender differences in this population for the reporting of anxiety and depressive symptoms; 2) perceived social support of family may have a greater impact on outcomes than perceived social support of friends in this population; 3) psychosocial factors, such as avoidance coping, are significantly related to outcomes and may be an area to target for intervention.

Table 4
Correlation Matrix of Predictor Variables, Potential Mediating Variables, and Continuous Outcome Variables of Anxiety and Depression

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Gender																	
2. Age	.001																
3. Adult Female in the House	.047	-.047															
4. Adult Male in the House	.037	-.037	.213**														
5. Birth Order	.068	-.004	-.060	.025													
6. Subject Having a Job	-.057	-.123*	.003	-.074	.061												
7. Number of Good Events	-.112*	-.047	-.054	-.063	-.119*	-.091											
8. Number of Bad Events[(a)]	-.139**	-.029	-.070	-.071	-.043	-.100*	.433**										
9. Negative Life Event Effect	-.233**	-.005	-.029	.011	.021	-.072	.338**	.581**									
10. Positive Life Event Effect	-.072	-.051	-.006	-.051	-.077	-.126**	.404**	.335**	.378**								
11. Optimism	.043	-.053	.016	.062	-.012	.095*	.125**	-.225**	-.135**	.044							
12. PSS - Family	-.085	.035	-.006	.019	.025	.109*	.046	-.222**	-.036	.090	.384**						
13. PSS- Friend	-.387**	.003	-.039	.005	-.023	.077	.126**	-.057	.120**	.101*	.250**	.374**					
14. Approach Coping	-.261**	.024	-.012	.002	-.151**	.031	.155**	.088	.142**	.187**	.202**	.249**	.415**				
15. Avoidance Coping	-.279**	.026	-.010	.017	-.183**	-.060	.048	.238**	.246**	.117*	-.202**	-.082	.209**	.599**			
16.Depression	-.279**	.074	.037	-.024	-.021	-.082	.053	.383**	.274**	.030	-.541**	-.401**	-.167**	-.008	.358**		
17.Anxiety	-.397**	.065	.031	.016	-.084	-.026	.110*	.253**	.224**	.015*	-.296**	-.089	-.030	.222**	.384**	.605**	-

Note. Correlations include Pearson's Product Moment Correlation and Spearman's Rho, (a)=Square root transformation of variable, NS=Non-significant Correlation, *$p < .05$, 2-tailed, and **$p < .01$, 2-tailed.

Table 5

Correlations of Predictor Variables, Potential Mediating Variables, and the Discrete Outcome Variable: Substance Abuse (Alcohol, Drugs, and Smoking)

	Alcohol yes/no	Drugs yes/no	Smoking yes/no
1. Gender	-.040	-.025	.051
2. Age	.140**	.044	.084
3. Adult Female in the House	.004	-.126**	-.005
4. Adult Male in the House	.021	-.103*	.013
5. Birth Order	.041	.009	.034
6. Subject Having a Job	-.043	.013	-.053
7.Number of Good Events	.029	.038	-.108*
8. Number of Bad Events[(a)]	.207**	.229**	.097*
9. Negative Life Event Effect	.107*	.061	.026
10. Positive Life Event Effect	.005	.051	.002
11. Optimism	-.175**	-.192**	-.227**
12. PSS - Family	-.175**	-.159**	-.229**
13. PSS- Friend	-.001	-.038	-.057
14. Approach Coping	.046	.045	-.031
15. Avoidance Coping	.138**	.172**	.146**
16.Depression	.138**	.172**	.146**
17.Anxiety	.147**	.138**	.016
18. Alcohol yes/no		.403**	.300**
19. Drugs yes/no			.284**
20. Smoking yes/no			

Note. Correlations include Pearson's Product Moment Correlation and Spearman's Rho, (a)=Square root transformation of variable, NS=Non-significant Relationship, *$\underline{p} < .05$, 2-tailed, and **$\underline{p} < .01$, 2-tailed.

C. Regression Analysis

Aim 3: Examine the mediating role of stress and psychosocial factors to explain the relationship between the demographic variables (age, gender, birth order, parents present in household, subject having a job) and the outcomes of anxiety, depression, and substance abuse (alcohol, drugs, smoking) in rural adolescents.

1. Preliminary Analysis

a. Anxiety

Initially, standard multiple linear regression was utilized with a model (Figure 4), containing the full variable set (demographics, life events, and psychosocial factors). It yielded a significant relationship with anxiety ($R=.586$, $R^2=.344$, $F(15, 423)= 14.782$, $p=.000$). This model fit was fair, explaining approximately 34% of the variance in the anxiety scores (Table 6). This model also does not take into consideration potential mediation.

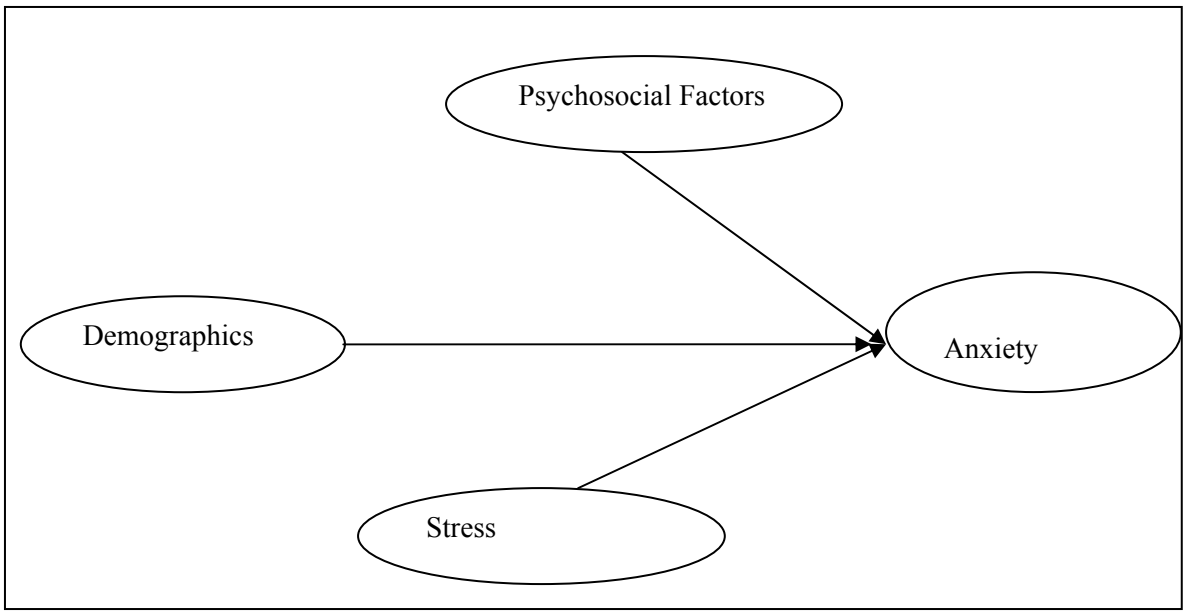

Figure 4. Full model of anxiety in rural adolescent (N=439). Demographics refer to age, gender, birth order, parents present in household, and subject having job. Stress is: Number of Good Life Events, Square Root # Bad Life Events, Negative Effect of Life Events, and Positive Effect of Life Events. Psychosocial Factors are optimism, perceived social support family and friend, and coping.

Table 6

Predictors of Anxiety-Full Model (n=439)

Predictor Variable	B	SE (B)	Beta	t-value	p-value
Gender	-6.752	7.890	-0.323	1.847	.000
Age	0.662	0.944	0.066	-7.156	.102
Adult female in the house	2.702	0.404	0.048	1.637	.241
Adult male in the house	1.254	2.299	0.038	1.175	.350
Birth Order	-0.208	1.339	-0.024	0.936	.563
Subject Having Job	0.403	0.359	0.017	-0.579	.675
Number of Good Life Events	-0.115	0.958	-0.011	0.420	.815
Sqrt # Bad Life Events	-0.003	0.493	0.000	-0.234	.996
Negative Effect of Life Events	0.204	0.568	0.054	-0.005	.256
Positive Effect of Life Events	1.115	0.180	0.104	1.137	.072
Optimism	-0.722	0.619	-0.303	1.802	.000
PSS-Family	-0.364	0.114	-0.180	-6.356	.000
PSS- Friend	0.144	0.101	0.085	-3.602	.077
Approach Coping	0.548	0.081	0.177	1.773	.002
Avoidance Coping	0.278	0.175	0.095	3.125	.105

Note. B=Regression coefficient, SE (B)= Standard Error of the regression coefficient, and Beta= Standardized regression coefficient.

Next, stepwise multiple linear regression was used to identify which selection of variables had a significant impact upon explaining the variance in anxiety scores. Stepwise criteria for entering a variable was: Probability-of-F-to-enter <= .050, to remove a variable was Probability-of-F-to-remove >= .100. The following variables were identified as having a significant impact upon explaining the variance in anxiety scores ($R = .580$, $R^2 = .337$, $F=10.056$ (8,429), $p < .01$): avoidance coping, optimism, gender, perceived social support of friend, number of bad life events, and approach coping. Forward and Backward entry of variables produced the similar results, with the exception of perceived social support of family being included in the backward model. However, it did not show significance when entered into the model (R^2change= .005, $F=3.286$ (9,430), $p= .071$) and was dropped from the subsequent models.

Two models based on the theoretical model of this study were then analyzed using hierarchical regression analysis to determine the best model to predict the variance in anxiety scores and to test the hypotheses (1.1-1.9) regarding direct relationships and potential mediation. The first model will include the variables indicated by the previous regression analyses with the addition of the variables that were found to be significantly related, though weakly correlated with anxiety through bivariate correlation: negative life events effect, number of good life events, and positive life events effect. The second model will include only the variables shown through regression to have significant impact on variance in anxiety scores (avoidance coping, optimism, gender, perceived social support of friend, number of bad life events, and approach coping).

Using hierarchical regression analysis, variables were entered into analysis based on the structural theoretical model (see model 3) proposed in this study. First the

demographic variable gender was entered, then the stress variable, then finally the psychosocial factors. The model had a fair ($R = .527$, $R^2 = .278$, $F=45.958$ (3,457), $p= .000$). The model including variables identified by both regression and bivariate correlations showed no significant contribution to the model by negative life events effect, number of good life events, or positive life events effect. This supported the findings of previous stepwise, forward, and backward regression that these variables did not contribute significantly to the variance in the anxiety scores. A decision was made to remove these variables for the final regression prior to testing the hypotheses on mediation.

The final regression analyses for anxiety (Table 7) showed a model (Figure 5) containing: gender, number of bad life events, optimism, perceived social support of friend, approach coping, and avoidance coping. The model was a fair fit explaining 33% of the variance in anxiety scores ($R = .577$, $R^2 = .333$, $F= -44.682$ (6,459), $p< .05$). All variables except perceived social support friend were directly, significantly related to anxiety as per bivariate correlation. There were 3 cases identified as being poorly explained by the model. These cases were subjects who had scores considered outliers for the sample. However, these cases were kept in because the variance of their scores is considered to be representative of the sample. Also, removing them did not improve the fit of the model or the variance of scores explained by it.

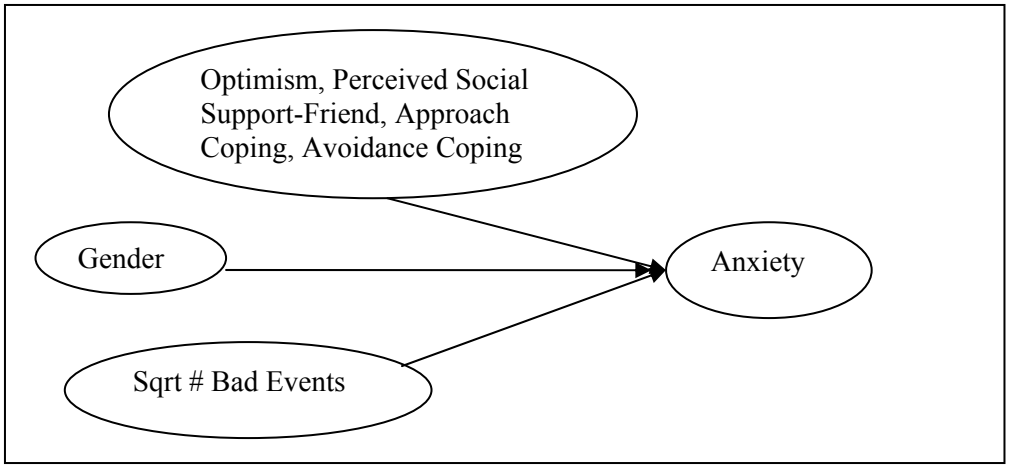

Figure 5. Final model of anxiety in rural adolescents (N=466).

Table 7

Predictors of Anxiety- Final Model (n=466)

Predictor Variables	B	SE (B)	Beta	t-value	p-value
Gender	-6.978	0.900	-0.333	-7.752	.000
SQRT # Bad Events	0.923	0.426	0.087	2.164	.031
Optimism	-0.652	0.106	-0.271	-6.135	.000
PSS-Friend	-0.356	0.093	-0.175	-3.840	.000
Approach Coping	0.374	0.160	0.127	2.337	.020
Avoidance Coping	0.517	0.165	0.167	3.131	.002

Note. B=Regression coefficient, SE (B)= Standard Error of the regression coefficient, and Beta= Standardized regression coefficient.

Using a series of hierarchical regression analyses, demographic variables were assessed for their influence on both stress and psychosocial factors and their relationship with anxiety. The hypotheses tested by these analyses (hypotheses 1.1 through 1.9) were: 1) direct relationships among the variables and 2) stress and/or psychosocial factors as mediators between demographics and anxiety (Figure 6).

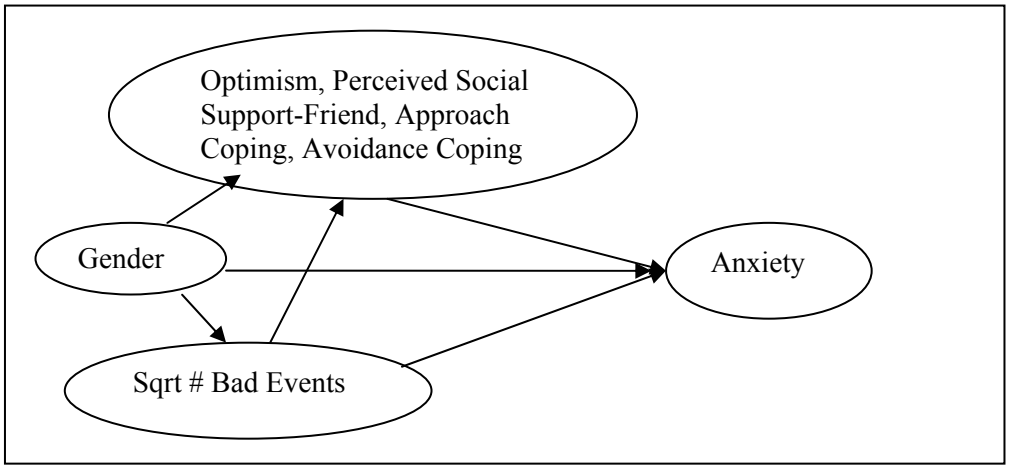

Figure 6. Hypothesized relationships between variables based on regression analysis and Lerner/Lazarus theoretical model.

b. Depression

Initially, standard multiple regression was utilized with the full variable set (demographics, life events, and psychosocial factors) (Figure 7). It yielded a significant relationship with depression (R= .718, R^2= .516, $F(15, 423)$= 30.031, p=.000), explaining approximately 52% of the variance in the depression scores (Table 8).

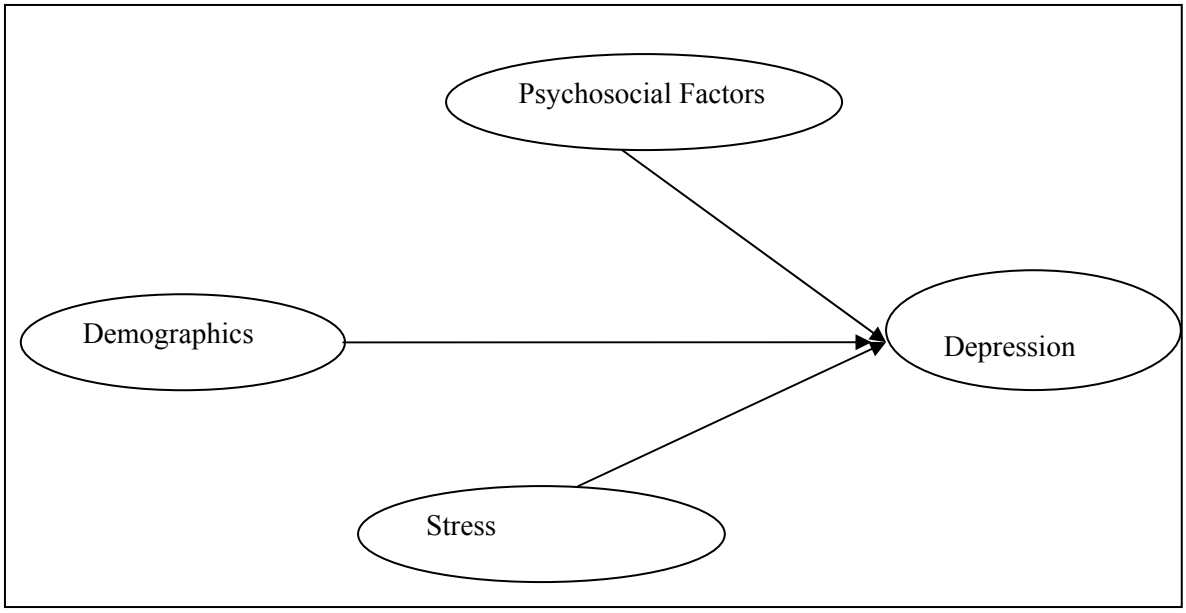

Figure 7. Full model of depression in rural adolescent (n=439). Demographics are age, gender, birth order, parents present in household, and subject having job. Stress is: Number of Good Life Events, Square Root # Bad Life Events, Negative Effect of Life Events, and Positive Effect of Life Events. Psychosocial Factors are optimism, perceived social support family and friend, and coping.

Table 8

Predictors of Depression- Full Model (n=439)

Predictor Variables	B	SE (B)	Beta	t-value	p-value
Gender	-8.200	1.242	-.256	-6.604	.000
Age	1.111	0.532	0.072	2.089	.037
Adult female in the house	5.573	3.026	0.065	1.842	.066
Adult male in the house	0.549	1.763	0.011	0.312	.756
Birth Order	0.311	0.472	0.023	0.659	.510
Subject Having Job	-0.279	1.261	-0.008	-0.221	.825
Number of Good Life Events	0.205	0.236	0.035	0.868	.386
Sqrt # Bad Life Events	3.418	0.815	0.209	4.195	.000
Negative Effect of Life Events	0.246	0.747	0.015	0.329	.742
Positive Effect of Life Events	-0.877	0.648	-0.053	-1.352	.177
Optimism	-1.211	0.149	-0.332	-8.103	.000
PSS-Family	-0.440	0.107	-0.169	-4.111	.000
PSS-Friend	-0.398	0.133	0.128	-2.993	.003
Approach Coping	-0.262	0.225	-0.059	-1.165	.245
Avoidance Coping	1.013	0.231	0.213	4.389	.000

Note. B=Regression coefficient, SE (B)= Standard Error of the regression coefficient, and Beta= Standardized regression coefficient.

Next, stepwise multiple linear regression was used to identify which selection of variables had a significant impact upon explaining the variance in depression scores. Stepwise criteria for entering a variable was: Probability-of-F-to-enter <= .050, to remove

a variable was Probability-of-F-to-remove >= .100. The following variables were identified as having a significant impact upon explaining the variance in depression scores ($R = .709$, $R^2 = .502$, $F=10.835$ (1,432), $p < .01$): gender, number of bad life events, optimism, perceived social support of family, perceived social support of friends, and avoidance coping. Forward and Backward entry of variables produced the similar results, with the exception of age being included in the forward model. However, it did not present in the other regressions and is not significantly correlated with depression so it will be dropped from subsequent models. Another variable, negative life event effect, was found to be significantly related, though weakly correlated with depressive symptoms through bivariate correlation ($r = .274$, $p < .01$). Because number of bad life events is significantly related and moderately correlated to depressive symptoms ($r = .383$, $p < .01$) and is present in the output and listed as accounting for a significant amount of the variance in the depression scores -each way the variables are entered (forward, backward, stepwise), number of bad life events will be included and negative life event effect will not.

Using hierarchical regression analysis variables were entered into analysis based on the structural theoretical model (see model 3) proposed in this study. First the demographic variable (gender) was entered, then the stress variable (number of bad life events), then finally the psychosocial factors (optimism, perceived social support of family, perceived social support of friend, and avoidance coping). The model had a good fit ($R = .705$, $R^2 = .498$, $F=66.084$ (4,459), $p = .000$) and explained approximately 50% of the variance in depression scores (Table 9, Figure 8).

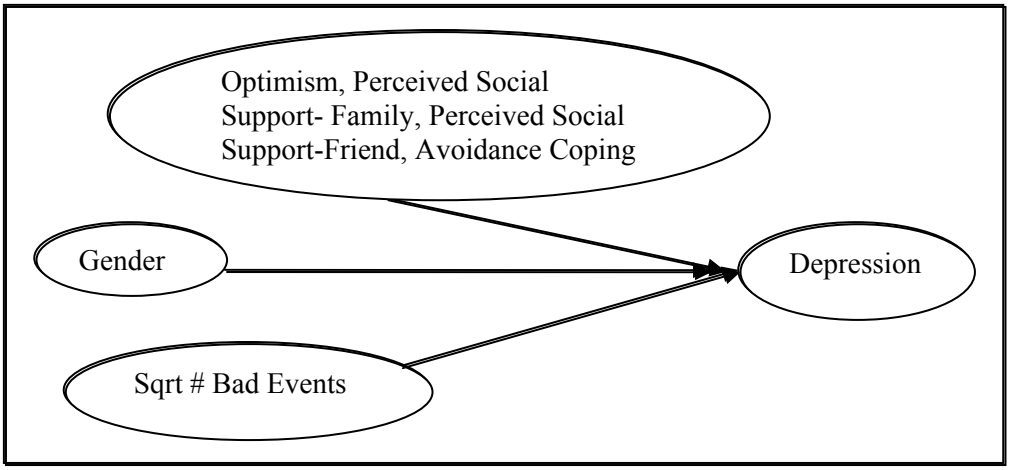

Figure 8. Final model of depression in rural adolescents (N=466).

Table 9

Predictors of Depression-Final Model (N=466)

Predictor Variables	B	SE (B)	Beta	t-value	p-value
Gender	-8.354	1.205	-.258	-6.936	.000
SQRT # Bad Events	3.233	0.577	0.197	5.603	.000
Optimism	-1.290	0.139	-0.347	-9.278	.000
PSS-Family	-0.454	0.126	-0.145	-3.612	.000
PSS-Friend	-0.458	0.101	-0.175	-4.553	.000
Avoidance Coping	0.877	0.174	0.184	5.030	.000

Note. B=Regression coefficient, SE (B)= Standard Error of the regression coefficient, and Beta= Standardized regression coefficient.

Using a series of small hierarchical regression analyses, demographic variables were assessed for their influence on both stress and psychosocial factors and their relationship with depression. The hypotheses tested by these analyses (hypotheses 1.1 through 1.9), were: 1) direct relationships among the variables and 2) stress and/or psychosocial factors as mediators between demographics and depression (Figure 9).

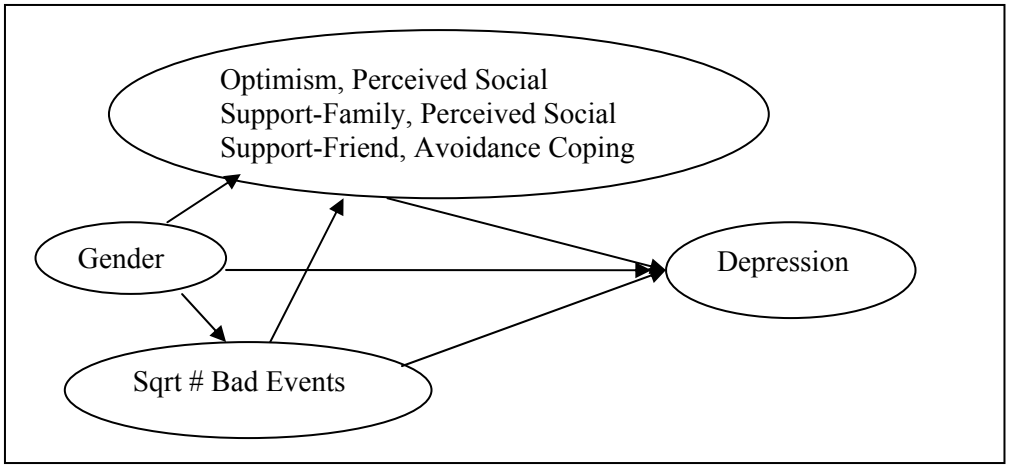

Figure 9. Hypothesized relationships between variables based on regression analysis and Lerner/Lazarus theoretical model (Depression).

c. Substance Abuse

Binary logistic regression was utilized to examine the predictor variables and their relationship to the outcome substance abuse due to the discrete nature of the outcome variables: alcohol yes/no, drugs yes/no, and smoking yes/no.

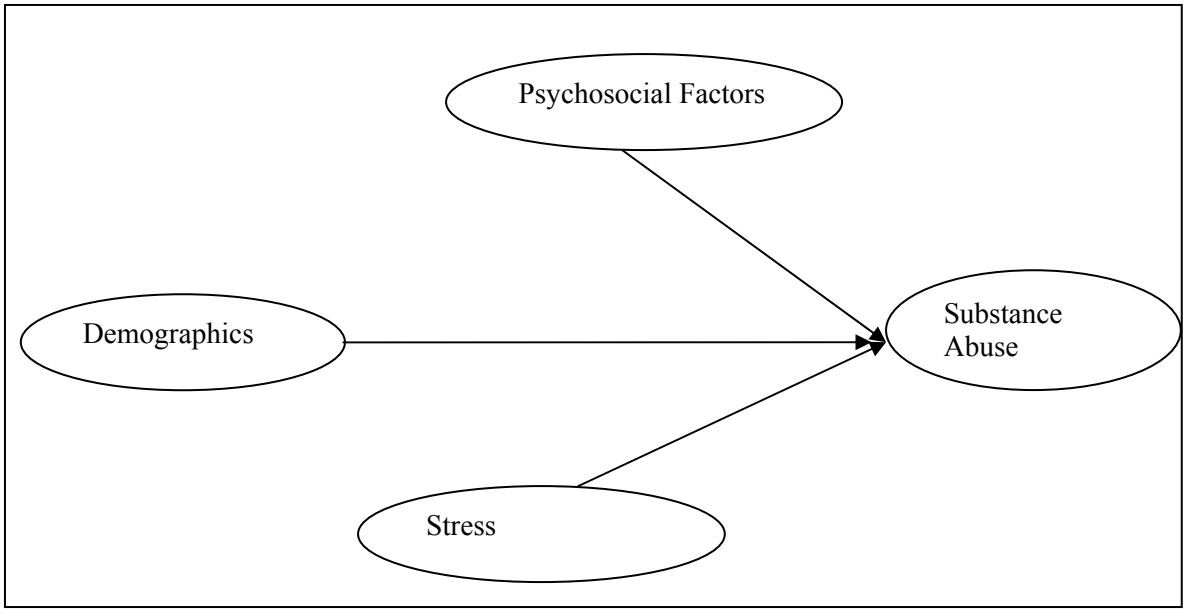

Figure 10. Full model of substance abuse in rural adolescent (N=439). Demographics are age, gender, birth order, parents present in household, and subject having job. Stress is: Number of Good Life Events, Square Root # Bad Life Events, Negative Effect of Life Events, and Positive Effect of Life Events. Psychosocial Factors are optimism, perceived social support family and friend, and coping. Substance Abuse refers to alcohol, drugs, and smoking.

i. Alcohol

A test of the full model with all 15 predictors against a constant-only model was statistically reliable, χ^2 (5, N=439) = 50.838, p< .001, indicating that the predictors, as a set, reliably distinguished between subjects who reported using alcohol and those who did not. The variance in reported alcohol use accounted for is small, with a Nagelkerke r^2 = .16. Prediction success was fair, with 16% of subjects not reporting alcohol use and 94.4% of subjects reporting alcohol use correctly predicted, for an overall success rate of 73.9%.

Using the Forward Stepwise (Wald) entry method, three predictors against a constant-only model was statistically reliable, χ^2 (3, N=439) = 38.202, p< .01, indicating that the predictors age, number of bad life events, and perceived social support of family, as a set, reliably distinguished between subjects who reported using alcohol and those who did not. The variance in reported alcohol use accounted for is small, with a Nagelkerke r^2 = .122. Prediction success was fair, with 7.8% of subjects not reporting alcohol use and 95.0% of subjects reporting alcohol use correctly predicted, for an overall success rate of 72%. Hosmer and Lemeshow comparison of the 2 models showed a non-significant result χ^2 (8, N=439) = 12.26, p=NS, indicating that the model with 3 predictors was not reliably different than the full model. The model with age, number of bad life events, and perceived social support of family adequately duplicates the observed frequencies at the various levels of the outcome (alcohol yes/no), there was no difference in the predictive reliability of the models. These three predictor variables will be used to test hypotheses 1.1-1.9 for the outcome of alcohol.

Table 10

Statistical Predictors of Alcohol-Full Model (N=439)

	B	SE B	Wald	df	Significance	Exp. B	95%CI lower	95%CI upper
Gender	-0.134	0.274	0.238	1	.625	0.875	0.512	1.496
Age	0.367	0.123	8.962	1	.003	1.443	1.135	1.835
adult female in the house	-0.285	0.656	0.189	1	.664	0.752	0.208	2.720
adult male in the house	-0.301	0.372	0.656	1	.418	0.740	0.357	1.534
Birth Order	0.207	0.106	3.838	1	.050	1.230	1.000	1.513
Subject Having Job	-0.018	0.278	0.004	1	.948	0.982	0.570	1.692
Number of good life events	0.021	0.051	0.163	1	.687	1.021	0.923	1.129
Sqrt # Bad Life Events	0.499	0.190	6.896	1	.009	1.648	1.135	2.392
Negative Effect of Life Events	-0.077	0.161	0.231	1	.631	0.926	0.675	1.269
Positive Effect of Life Events	-0.177	0.138	1.657	1	.198	0.837	0.639	1.097
Optimism	-0.035	0.032	1.182	1	.277	0.966	0.907	1.028
PSS-Family	-0.067	0.024	7.522	1	.006	0.936	0.892	0.981
PSS-Friend	0.030	0.030	1.034	1	.309	1.031	0.972	1.092
Approach Coping	0.034	0.048	0.508	1	.476	1.035	0.942	1.136
Avoidance Coping	0.049	0.049	1.009	1	.315	1.050	0.955	1.155

Note. B=Beta, SE B=Standard Error Beta, df= degrees of freedom and CI =confidence interval.

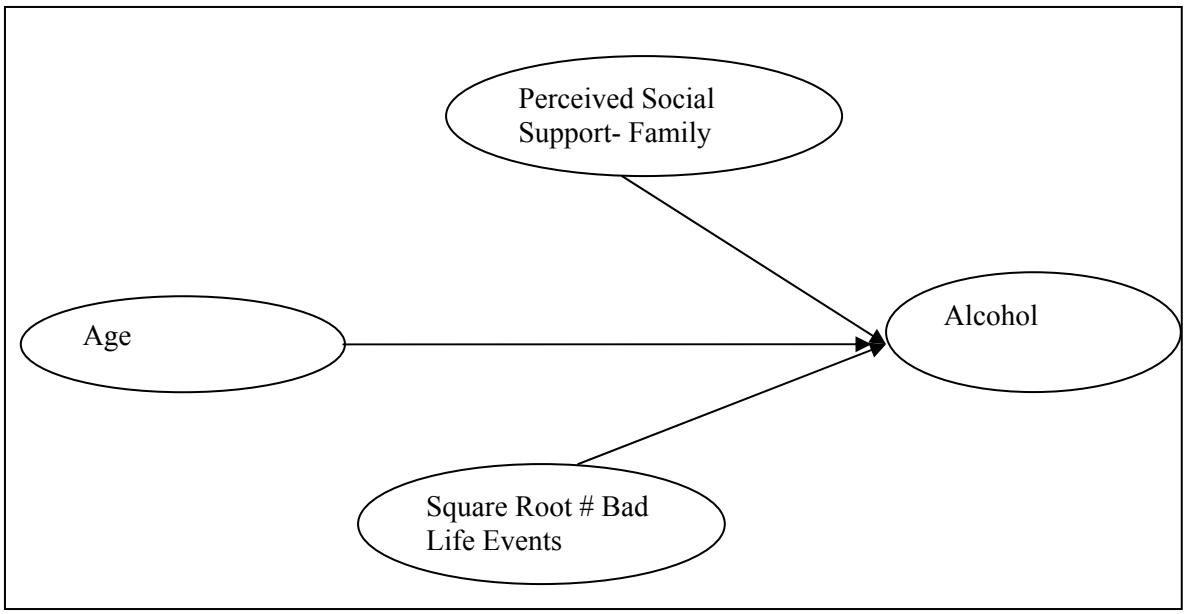

Figure 11. Three predictor model of substance abuse in rural adolescent (N=439).

Table 11

Statistical Predictors of Alcohol- Three predictor model (N=439)

Predictor Variables	B	SE B	Wald	df	Significance	Exp. B	95%CI lower	95%CI upper
Age	0.356	0.118	9.034	1	.003	1.428	1.132	1.801
Sqrt # Bad Life Events	0.437	0.124	12.445	1	.000	1.548	1.214	1.974
PSS-Family	-0.065	0.020	10.759	1	.001	0.937	0.901	0.974

Note. B=Beta, SE B=Standard Error Beta, df= degrees of freedom and CI =confidence interval.

ii. Drugs

A test of the full model with all 15 predictors against a constant-only model was statistically reliable, χ^2 (15, N=439) = 54.174, p< .001, indicating that the predictors, as a set, reliably distinguished between subjects who reported using drugs and those who did not. The variance in reported drug use accounted for is small, with Nagelkerke r^2 = .155. Prediction success was fair, with 63.2% of subjects not reporting drug use and 68.7% of subjects reporting drug use correctly predicted, for an overall success rate of 66.1%.

Table 12

Statistical Predictors of Drugs-Full Model (N=439)

Predictor Variables	B	SE B	Wald	df	Significance	Exp. B	95%CI Lower	95%CI Upper
Gender	-0.074	0.237	0.096	1	.756	0.929	0.583	1.480
Age	0.090	0.102	0.777	1	.378	1.094	0.896	1.337
adult female in the house	1.673	0.815	4.214	1	.040	5.330	1.079	26.340
adult male in the house	0.425	0.351	1.464	1	.226	1.530	0.768	3.046
Birth Order	0.046	0.092	0.253	1	.615	1.047	0.875	1.253
Subject Having Job	-0.223	0.242	0.850	1	.357	0.800	0.498	1.285
Number of good life events	-0.011	0.045	0.059	1	.808	0.989	0.906	1.080
Sqrt # Bad Life Events	0.528	0.160	10.855	1	.001	1.696	1.239	2.322
Negative Effect of Life Events	-0.278	0.144	3.717	1	.054	0.757	0.570	1.005
Positive Effect of Life Events	0.035	0.124	0.080	1	.778	1.036	0.813	1.319
Optimism	-0.036	0.029	1.526	1	.217	0.965	0.912	1.021
PSS-Family	-0.029	0.020	1.987	1	.159	0.972	0.933	1.011
PSS-Friend	-0.007	0.026	0.077	1	.782	0.993	0.944	1.044
Approach Coping	0.000	0.043	0.000	1	.994	1.000	0.919	1.088
Avoidance Coping	0.104	0.044	5.462	1	.019	1.109	1.017	1.210

Note. B=Beta, SE B=Standard Error Beta, df= degrees of freedom and CI =confidence interval.

Hosmer and Lemeshow comparison of the full model and a model using the Forward Stepwise (Wald) entry method in which 5 predictors: adult female in the house, number of bad life events, and negative effect of life events, optimism, and avoidance coping as a set, reliably distinguished between subjects who reported using drug and those who did not χ^2 (8, N=439) = 8.068, p=NS. The variance in reported drug use accounted for is small, with a Nagelkerke r^2 = .155. Prediction success was fair, with 63.2% of subjects not reporting alcohol use and 68.7% of subjects reporting drug use correctly predicted, for an overall success rate of 66.1%. Because statistical testing indicated that the model with 5 predictors was not reliably different than the full model, the model with adult female in the house, number of bad life events, and negative effect of life events, optimism, and avoidance coping will be used for any subsequent testing of mediating variables.

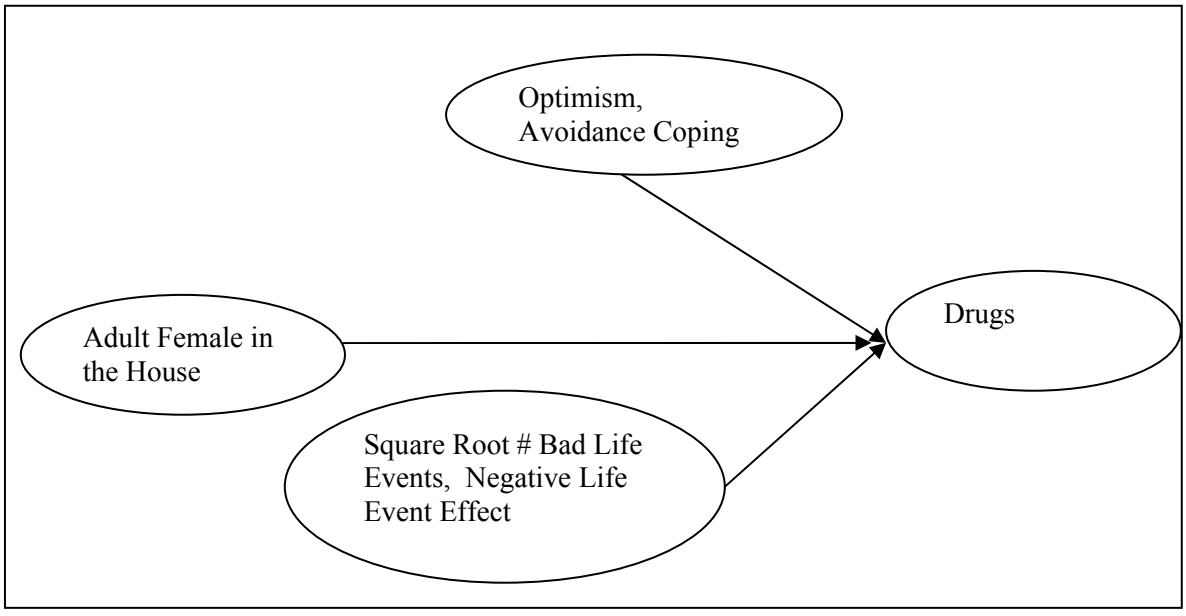

Figure 12. Five predictor model of drug yes/no in rural adolescent (N=439).

Table 13

Statistical Predictors of Drug- Five predictor model (N=439)

Predictor Variables	B	SE B	Wald	df	Significance	Exp. B	95%CI lower	95%CI upper
Adult Female in the House	1.827	0.798	5.244	1	.022	6.216	1.301	29.695
Sqrt # Bad Life Events	-0.320	0.137	5.432	1	.020	0.726	0.555	0.950
Negative Effect of Life Event	0.571	0.146	15.238	1	.000	1.770	1.329	2.357
Optimism	-0.056	0.025	5.159	1	.023	0.946	0.901	0.992
Avoidance Coping	0.093	0.032	8.351	1	.004	1.098	1.030	1.170

Note. B=Beta, SE B=Standard Error Beta, df= degrees of freedom and CI =confidence interval.

iii. Smoking

A test of the full model with all 15 predictors against a constant-only model was statistically reliable, χ^2 (15, N=439) = 56.581, p<.001, indicating that the predictors, as a set, reliably distinguished between subjects who reported smoking and those who did not. The variance in reported drug use accounted for is small, with Nagelkerke r^2 = .164. Prediction success was fair, with 83% of subjects not reporting drug use and 36% of subjects reporting smoking correctly predicted, for an overall success rate of 65.1%.

Table 14

Statistical Predictors of Smoking-Full Model (N=439)

Predictor Variables	B	SE B	Wald	df	Significance	Exp. B	95%CI lower	95%CI upper
Gender	0.458	0.245	3.484	1	.062	1.580	0.977	2.555
Age	0.154	0.105	2.123	1	.145	1.166	0.948	1.433
adult female in the house	-0.122	0.589	0.043	1	.836	0.885	0.279	2.807
adult male in the house	0.230	0.352	0.426	1	.514	1.258	0.631	2.508
Birth Order	0.033	0.092	0.127	1	.721	1.034	0.862	1.239
Subject Having Job	-0.023	0.245	0.009	1	.925	0.977	0.605	1.578
Number of good life events	-0.097	0.049	3.893	1	.048	0.908	0.824	0.999
Sqrt # Bad Life Events	0.191	0.159	1.443	1	.230	1.211	0.886	1.654
Negative Effect of Life Events	-0.109	0.148	0.546	1	.460	0.896	0.671	1.198
Positive Effect of Life Events	0.131	0.127	1.073	1	.300	1.140	0.889	1.463
Optimism	-0.062	0.030	4.385	1	.036	0.939	0.886	0.996
PSS-Family	-0.059	0.021	8.116	1	.004	0.942	0.905	0.982
PSS-Friend	0.035	0.026	1.834	1	.176	1.036	0.984	1.090
Approach Coping	-0.056	0.045	1.578	1	.209	0.945	0.865	1.032
Avoidance Coping	0.129	0.047	7.659	1	.006	1.137	1.038	1.246

Note. B=Beta, SE B=Standard Error Beta, df= degrees of freedom and CI =confidence interval.

Hosmer and Lemeshow comparison of the full model and a model using the Forward Stepwise (Wald) and Backward Stepwise (Wald) entry methods in which 8 predictors gender, age, number of good life events, negative effect of life events, positive effect of life events, optimism, perceived social support of family, and avoidance coping as a set, reliably distinguished between subjects who reported smoking and those who did not χ^2 (8, N=439) = 14.665, p=NS. The variance in reported smoking accounted for is small, with a Nagelkerke r^2 = .155. Prediction success was fair, with 84.1% of subjects not reporting smoking and 34.3% of subjects reporting smoking correctly predicted, for an overall success rate of 64.9%. Because statistical testing indicated that the model with 8 predictors was not reliably different than the full model, the model with gender, age, number of good life events, negative effect of life events, positive effect of life events, optimism, perceived social support of family, and avoidance coping will be used for any subsequent testing of mediating variables.

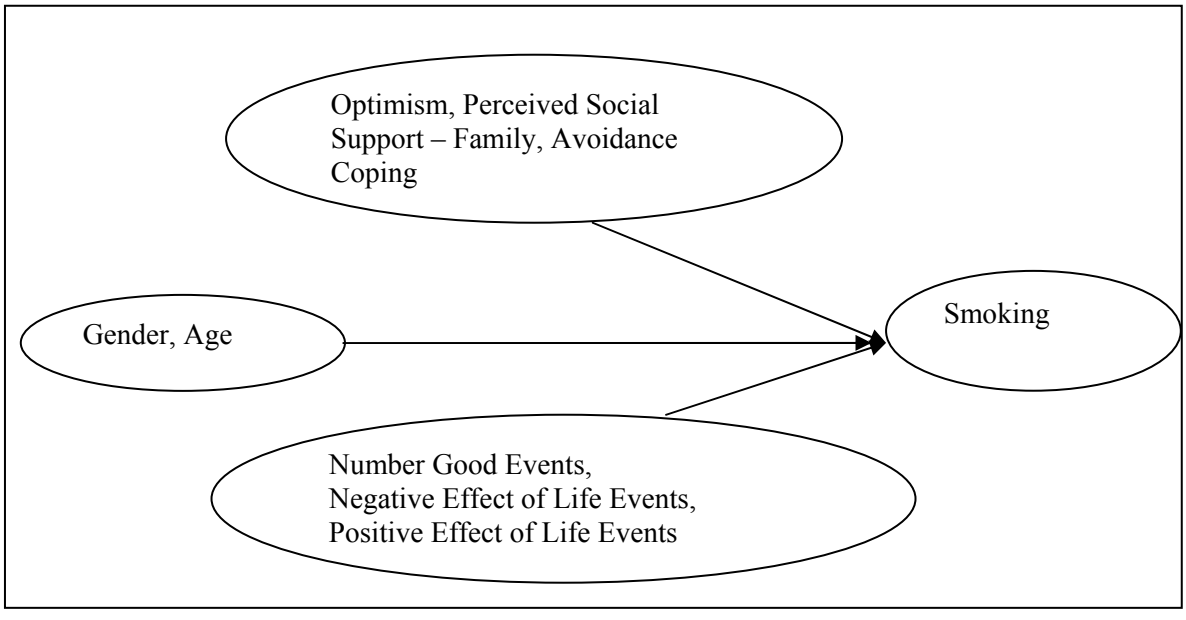

Figure 13. Eight predictor model of smoking in rural adolescent (N=439).

Table 15

Statistical Predictors of Smoking- Eight predictor model (N=439)

Predictor Variables	B	SE B	Wald	df	Significance	Exp. B	95%CI lower	95%CI upper
Gender	0.384	0.228	2.830	1	.093	1.468	0.939	2.294
Age	0.152	0.103	2.167	1	.141	1.164	0.951	1.426
Number Good Events	-0.083	0.046	3.331	1	.068	0.920	0.841	1.006
Negative Effect of Life Event	0.007	0.123	0.003	1	.953	1.007	0.792	1.281
Positive Effect of Life Event	0.127	0.124	1.053	1	.305	1.136	0.891	1.449
Optimism	-0.071	0.028	6.399	1	.011	0.932	0.882	0.984
PSS-Family	-0.061	0.019	10.152	1	.001	0.941	0.906	0.977
Avoidance Coping	0.102	0.035	8.490	1	.004	1.107	1.034	1.185

Note. B=Beta, SE B=Standard Error Beta, df= degrees of freedom and CI =confidence interval

Because data for path analysis the data set is required to meet the same assumptions needed to conduct multiple linear regression (Norris, 2001), the discrete variables used to measure the outcome of substance abuse do not lend themselves to path analysis. Therefore, to test hypothesis 1.7 through 1.9 hierarchical binomial linear regression will be used to attempt to determine mediation through comparison of change the unstandardized beta (referred to as Beta), however direct and indirect effects will not be able to be calculated. This is a limitation of the data analysis. Direct relationships (hypotheses 1.1 through 1.6) will be represented by the significant correlations between demographics, stress, psychosocial factors, and the outcome substance abuse.

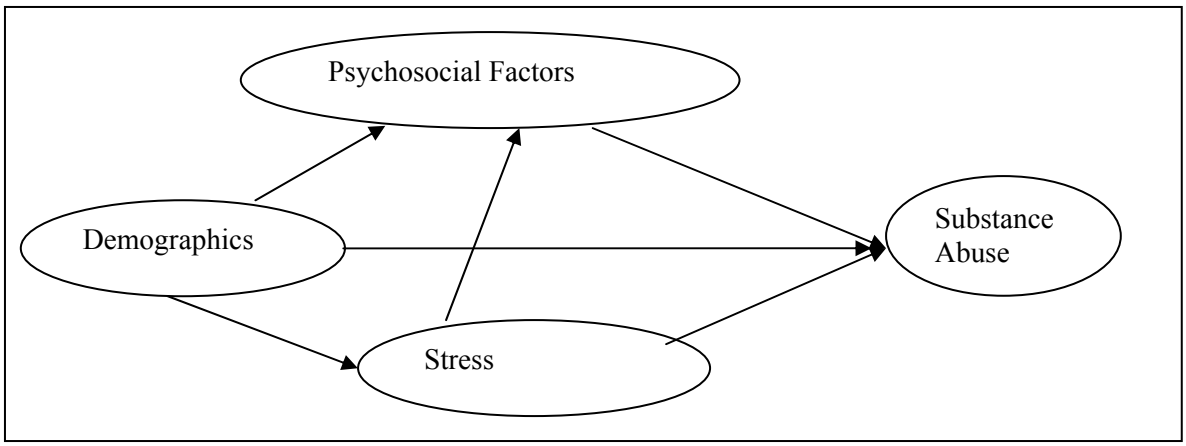

Figure 14. Hypothesized relationships between variables based on regression analysis and Lerner/Lazarus theoretical model (Substance Abuse).

2. Hypotheses Testing

The direct relationships in hypotheses 1.1 through 1.6 were examined by calculating the direct effects using Wright's method (as cited by Norris, 2001). For the hypotheses examining the direct relationships between discrete variables, significant correlations will be used to represent the direct relationships. Mediation (hypotheses 1.7 through 1.9) was examined by calculating direct and indirect effects and by the changes in Beta. All relationships and direct effects reported for hypotheses 1.1 through 1.6 were significant at least at the .05 level.

Hypothesis 1.1: There will be a direct relationship between selected demographic variables (age, gender, birth order, parents present in household, subject having a job) and the outcomes of anxiety, depression, and substance abuse.

This hypothesis is partially supported. Gender had a significant negative relationship with anxiety symptoms and depressive symptoms (see Table 4). Gender also had estimated direct effect of -.369 for anxiety and -.281 for depressive symptoms. Age had a significant positive relationship with reported alcohol abuse (see Table 5) and had a beta of .356 when regressed with alcohol. Having an adult female in the house and having an adult male in the house each had a significant relationship with reported drug abuse (see Table 5). However, only having an adult female in the house was included in the final model for drug abuse having a Beta of 1.827. No demographic variable had a significant correlation with smoking; however, both gender and age were identified in the final regression model for smoking. When attempting to obtain a Beta for age alone to explain smoking, the variable was found to be non-significant with a Beta of .168; in the model, the Beta was .152. Gender was also non-significant in the model but when

regressed alone with smoking was significant with a Beta of .216; in the model, the Beta was .384. This suggests some of the variables may have been identified for inclusion in the model because of their relationship with other variables.

Hypothesis1.2: There will be a direct relationship between selected demographic variables (age, gender, birth order, parents present in household, subject having a job) and stress (life events).

This hypothesis was partially supported. Gender, birth order, and subject having a job were all significantly related to at least one variable representing stress (life events); however, only gender was found to have a direct effect with stress (See Table 4). Gender had an estimated direct effect on the number of bad life events of -.128.

Hypothesis 1.3: There will be a direct relationship between selected demographic variables (age, gender, birth order, parents present in household, subject having a job) and psychosocial factors (optimism, perceived social support, and coping).

This hypothesis was partially supported. Gender, birth order, and subject having a job were all significantly related to the psychosocial factors of optimism, perceived social support, and coping (See Table 4). However, only gender had a direct effect. Gender had a direct effect on perceived social support of family (-.113), perceived social support of friends (-.402), approach coping (-.259), and avoidance coping (-.263).

Hypothesis 1.4: There will be a direct relationship between psychosocial factors (optimism, perceived social support, and coping,) and the outcomes of anxiety, depression, and substance abuse.

This hypothesis was partially supported. Psychosocial factors of optimism, perceived social support, and coping were all significantly related to at least one outcome (see Table 4 and Table 5). Optimism had an estimated direct effect on anxiety symptoms (-.312) and depressive symptoms (-.475). The Beta for optimism when regressed alone with drug abuse was -.087 and for smoking was .027. Perceived social support of family had an estimated direct effect on depressive symptoms (-.361). The Beta for perceived social support of family when regressed alone with alcohol was -.069. Perceived social support of friend had an estimated direct effect on anxiety symptoms (-.183) and on depressive symptoms (-.288). Approach coping had an estimated direct effect on anxiety symptoms of .094. The estimated direct effect of avoidance coping on anxiety symptoms was .264 and on depressive symptoms was .236. The Betas for avoidance coping when regressed alone with drug abuse and smoking were .108 and .033 respectively.

Hypothesis 1.5: There will be a direct relationship between stress (life events) and the outcomes of anxiety, depression, and substance abuse.

This hypothesis was partially supported. Stress (life events) was significantly related to the outcomes (see Table 4 and Table 5). Number of negative life events was significantly related to each outcome and had an estimated direct effect on anxiety symptoms (.244) and depressive symptoms (.297). The number of bad life events, when regressed alone with alcohol and with drugs had Betas of .495 and .462, respectively. The number of good life events, positive life event effect and negative life event effect were each included in the model for smoking; only the number of good life events was significant in the model with a Beta of -.083. However, when regressed alone with smoking each was significant and had Betas of -.104, .093, and .148, respectively.

Hypothesis 1.6: There will be a direct relationship between stress (life events) and psychosocial factors (optimism, perceived social support, and coping).

This hypothesis was partially supported with each variable representing stress being significantly related to at least one psychosocial factor (see Table 4). However, only the number of bad life events had an estimated significant direct effect on optimism (-.213), perceived social support of family (-.239), perceived social support of friends (-.100), and avoidance coping (.194). There was a non-significant direct effect of the number of bad life events on approach coping of .049.

Hypothesis 1.7: The relationship between stress (life events) and outcomes of anxiety, depression, and substance use will be mediated by psychosocial factors (optimism, perceived social support, and coping).

Stress, Anxiety, and Psychosocial Factors

Using a series of hierarchical regression analysis, the following psychosocial factors each had a significant indirect effect when regressed with number of bad life events and anxiety indicating mediation: optimism (standardized coefficient for indirect effect= .068, p= .000); approach coping (standardized coefficient for indirect effect= .01, p= .000); avoidance coping (standardized coefficient for indirect effect= .08, p= .000). There was no significant indirect effect with perceived social support of friend. These findings partially support the hypothesis that the relationship between stress and anxiety is mediated by psychosocial factors.

Stress, Depression, and Psychosocial Factors

Using a series of hierarchical regression analysis, the following psychosocial factors each had a significant indirect effect when regressed with number of bad life events and depression indicating mediation: optimism (standardized coefficient for indirect effect= .10, p= .000); perceived social support of family (standardized coefficient for indirect effect= .07, p= .000); avoidance coping (standardized coefficient for indirect effect= .06, p= .000). There was no indirect effect with perceived social support of friend. These findings partially support the hypothesis that the relationship between stress and depression is mediated by psychosocial factors.

Stress, Substance Abuse, and Psychosocial Factors

This hypothesis is supported in alcohol with predictors the number of bad life events and perceived social support of family. There was a decrease in the Beta of the number of bad life events from .495 to .434 when perceived social support of family entered the model and a decrease in the Beta of perceived social support of family from -.057 to -.069, suggesting mediation.

For simplicity, when evaluating drug and its potential mediator of stress, only the number of bad life events will be used to test this hypothesis, it is similar to the negative life event effect and is from the same construct of stress, it is also more significantly correlated to drug use ($r= .207$, $p< .01$ vs. $r= .107$. $p< .05$). Mediation is suggested with the number of bad life events and both optimism and avoidance coping. With optimism, the Beta of the number of bad life events decreased from .462 to .410 and optimism increased from -.083 to -.066. With avoidance coping, the Beta of the number of bad life

events decreased from .462 to .404 and avoidance coping decreased from .108 to .085. Mediation is suggested and the hypothesis is supported.

This hypothesis is supported looking at Beta changes for smoking regressed onto the number of good life events (decrease from -.104 to -.106), negative effect of life events (decrease from .148 to .123), and positive effect of life events (increase from .093 to .097), with optimism decreased (.027 to -.70), perceived social support of family decreased (.018 to -.59), and avoidance coping increased (.033 to .09), suggesting mediation is occurring.

Hypothesis 1.8: The relationship between demographics (age, gender, birth order, parents present in the household, and subject having a job) and outcomes of anxiety, depression, and substance abuse will be mediated by psychosocial factors (optimism, perceived social support, and coping).

Demographics, Anxiety, and Psychosocial Factors

Using a series of hierarchical regression analysis, the following psychosocial factors each had a significant indirect effect when regressed with gender and anxiety indicating mediation: optimism (standardized coefficient for indirect effect= -.02, p= .000); perceived social support of friend (standardized coefficient for indirect effect= .08, p= .000); approach coping (standardized coefficient for indirect effect= -.03, p< .05); avoidance coping (standardized coefficient for indirect effect=. -.08, p= .000). This supports the hypothesis that the relationship between stress and anxiety is mediated by psychosocial factors.

Demographics, Depression, and Psychosocial Factors

Using a series of hierarchical regression analysis, the following psychosocial factors each had a significant indirect effect when regressed with gender and depression indicating mediation: optimism (standardized coefficient for indirect effect= -.02, p=.000); perceived social support of family (standardized coefficient for indirect effect= .04, p=.000); perceived social support of friend (standardized coefficient for indirect effect= .127, p=.000); avoidance coping (standardized coefficient for indirect effect= -.08, p=.000). This supports the hypothesis that the relationship between stress and depression is mediated by psychosocial factors.

Demographics, Substance Abuse, and Psychosocial Factors

This hypothesis is supported in alcohol with the predictors: age and perceived social support of family. There was an increase in the Beta of age from .321 to .355, when perceived social support of family entered the model, and a decrease in the Beta of perceived social support of family from -.057 to -.074, suggesting mediation.

This hypothesis is partially supported in drugs with the predictors: avoidance coping and adult female in the house. There was a decrease in the Beta of adult female in the house from -1.818 to –1.857 when avoidance coping entered the model. There was no change in Beta of adult female in the house when optimism entered the model.

When attempting to obtain a Beta for age alone to explain smoking, the variable was found to be non-significant. This suggests that the variable is contained in the model because of its relationship with another variable. Age was also not significantly correlated to smoking. This suggests a possible relationship between age and gender when regressed with smoking. Age was not used to determine mediation. The hypothesis

is supported for smoking regressed onto gender with optimism, perceived social support of family, and avoidance coping. Beta for gender increased from .216 to .390, optimism decreased (.027 to -.70), perceived social support of family decreased (.018 to -.59), and avoidance coping increased (.033 to .09), suggesting mediation is occurring.

Hypothesis 1.9: The relationship between demographics (age, gender, birth order, parents present in the household, and subject having a job) and outcomes of anxiety, depression, and substance abuse will be mediated by both stress (life events) and psychosocial factors (optimism, perceived social support, and coping).

Demographics, Anxiety, Stress, and Psychosocial Factors

This hypothesis was partially supported. The relationship between gender and anxiety was mediated by the number of bad life events (standardized coefficient for indirect effect= -.03, p= .000). When regressing the outcome anxiety onto the demographic variable gender with the stress variable the number of bad life events and the psychosocial factor optimism all pathways remain statistically significant (R= .518, R^2adj.=.264, F = 56.469 (3,462), p=.000). There is a direct effect for gender (-.338) and the standardized coefficient for the total indirect effect = -.03, (p= .000) indicating mediation.

When gender is regressed onto anxiety with both the number of bad life events and perceived social support of friends, all pathways remain significant (R= .451, R^2adj.= .204, F = 39.365 (3,462), p=.000). There is a direct effect for gender (-.417) and the standardized coefficient for the total indirect effect = .05, (p< .05) indicating mediation.

When the psychosocial factor in the regression is avoidance coping, all pathways remain significant (R= .487, R^2adj= .232, F = 47.757 (3,462), p=.000). Gender's direct effect is -.273 with the total indirect effect of -.096 (p= .000).

Regressing gender onto anxiety with the number of bad life events and approach coping, the pathway from the stress variable (the number of bad life events) and the psychosocial factor (approach coping) is non-significant. There is no indirect effect. Each variable has an indirect effect with gender and anxiety, but this regression did not fully support the hypothesis because individually these variables (the number of bad life events and approach coping) were each mediators between gender and anxiety with an indirect effects standardized coefficient of -.02 (p= .001) and .03 (p< .05), respectively, but the variables did not have an indirect effect together. The demographic variable (gender) was not mediated by both stress and psychosocial factors; but was mediated by each separately.

Demographics, Depression, Stress, and Psychosocial Factors

This hypothesis was supported. The relationship between gender and depression was mediated by the number of bad life events (standardized coefficient for indirect effect=. -.05, p= .000). When regressing the outcome depression onto the demographic variable gender with the stress variable the number of bad life events and the psychosocial factor optimism all pathways to depression remain statistically significant (R= .651, R^2adj.= .420, F = 113.127 (3,462), p=.000). Gender has a direct effect (-.227) and the standardized coefficient for the total indirect effect = -.05, (p= .000) indicates mediation.

When gender is regressed onto depression with the number of bad life events and perceived social support of family, all pathways remain significant (R= .575, R^2adj.= .326, F = 76.045 (3,462), p= .000). There is a direct effect for gender (-.275) and the standardized coefficient for the total indirect effect = -.01, (p< .05) indicates mediation.

When gender is regressed onto depression with the number of bad life events and perceived social support of friend, all pathways remain significant (R= .527, R^2adj.= .273, F = 59.210 (3,462), p= .000). There is a direct effect for gender (-.350) and the standardized coefficient for the total indirect effect = .07, (p<.01) indicated mediation.

When the psychosocial factor in the regression is avoidance coping, all pathways remain significant (R=.507, R^2adj=.252, F = 53.344 (3,462), p=.000). Gender's direct effect is -.172 with the total indirect effect -.11 (p= .000).

Demographics, Substance Abuse, Stress, and Psychosocial Factors

This hypothesis is supported in alcohol with the predictors the number of bad life events and perceived social support of family are entered into the model with age, there is an increase in the Beta for age from .32 to .372, a decrease in the Beta the number of bad life events from .495 to .447, and an increase for the Beta perceived social support of family from -.057 to -.061 suggesting mediation.

This hypothesis is supported in drugs with the predictors the number of bad life events and avoidance coping are entered into the model with adult female in the house, there is an increase in the Beta for the demographic variable from -1.818 to -1.773, a decrease in the Beta for the number of bad life events from .462 to .385, and a decrease for the Beta avoidance coping from .108 to .084 suggesting mediation.

This hypothesis is supported with the variable smoking when looking the change in Betas and the variables gender (increase from .216 to .390) with number of good life events (increase from -.104 to -.086), negative effect of life events (decrease from .148 to .004), and positive effect of life events (increase from -.104 to -.086), and optimism (decrease from .027 to -.084), perceived social support of family (decrease from .018 to -.062) and avoidance coping (increase from .033 to .090), supporting mediation occurring.

Chapter 5

Summary and Conclusions

A. Discussion

Hypothesis 1.0: The proposed model describes the structure of relationships among the selected variables (demographics, stress, and psychosocial factors) as they influence the outcomes of anxiety, depression, and substance abuse in rural adolescents (see figure 1).

1. Model Fit

The theoretical model proposed described the structure of the relationships among the variables adequately as evidenced by the data supporting the hypotheses regarding mediation of variables as discussed in the results section. All demographic variables (Causal antecedents), except for subject having a job, were found to be significantly bi-variately correlated to at least one outcome (Effect/Dynamic Interaction). Stress (Plasticity), particularly the number of bad life events was not only significantly bivariately correlated with each outcome, but regression analysis results also supported it having both a direct effect on those outcomes and a mediating effect with demographics and outcomes. Analysis also supported the hypothesis of psychosocial factors (Mediating Processes/Embeddedness) as mediating variables between: stress (i.e. number of bad life events) and outcomes; demographic variables (gender, age) and outcomes; and demographics, stress, and outcomes.

Model fit varied statistically. The final model for depression was a good fit with fair predictability of the variance in scores. The model for anxiety was a fair fit with fair to poor predictability in the variance of scores. The models for alcohol, drugs, and smoking were able to reliably distinguish 65%-75% of the time between subjects who

reported using alcohol and those who did not, but was poor in predicting the variance of scores.

Some variables were highly correlated with the outcomes but were not found to be highly predictive of the variance in the scores of the outcomes. This may be due to the analysis used. Results from the type of analysis used in this study (i.e. multiple and binomial linear regression) should be interpreted with caution (Tabachnick and Fidell, 2001). A more sophisticated method of analysis, such as structural equation modeling, may provide a better interpretation of the data and its fit with the proposed theoretical model.

2. Summary of Findings

a. Anxiety

Over 20% of students reported levels of anxiety symptoms consistent with a diagnosable anxiety disorder. Wren, Bridge, & Birmaher (2004) found that female patients in both suburban and rural populations in western Pennsylvania reported a greater excess of anxiety symptoms. In fact, anxiety disorders appear with greater frequency in women (Morrison, 1995). Gender was significantly related to the reporting of these symptoms with females reporting more anxiety symptoms than males in this study, thus supporting the findings in the literature. In this study anxiety was significantly negatively related to optimism and significantly positively related to the number of good and bad life events reported, the negative and positive effects of those events, and the reported use of both approach and avoidance coping skills. This supports previous findings in the literature that anxiety can affect an individual's perception of life events (Harkness & Luthur, 2001) as well as increase the use of avoidance coping in

dealing with situations (Velting et al, 2004). The relationship with approach coping may be explained by the fact that someone with anxiety may be utilizing all of their coping skills to attempt to function. The reporting of individuals with anxiety having impaired social support (Harkness & Luthur, 2001) was not supported statistically in this study. However, perceived social support of friends was found to have potential as a mediator between gender, number of negative life events, and anxiety. The support of psychosocial factors as mediators in this study, and the relationship between anxiety and coping, indicate that this may be an area to target for intervention. This supports previous findings by Puskar, Sereika, and Tusaie-Mumford (2003) that targeting an area such as 'coping' may improve outcomes for rural adolescents.

b. Depression

Approximately 33% of this rural adolescent sample reported having some depressive symptoms. Gender differences were seen in the outcome depression, indicating that female subjects were reporting more symptoms of depression. This supports findings that gender differences in depressive symptoms begin in adolescence (Ge, Elder, & Conger, 2001). The literature also endorses that these gender differences in depressive symptoms persist over time. However due to the cross sectional nature of the data in this analysis, this was unable to be explored. The literature also indicates that there may be significant differences in the presentation of depressive symptoms based on subjects not living with both biological parents (Lewinsohn, Rohde, Seeley, Klein, & Gotlieb, 2003). There was no relationship between the presence of parents in the house and the outcome of depression in this study. Stressful life events have also been indicated in increasing the risk for adolescents developing depression events (Compas, et.al, 1995;

Birmaher, et.al, 1996; Ge, et.al, 2001). The findings in this study support this, with the number of negative life events being both significantly positively related to depression as well as predicting the variability in depression scores within this rural adolescent sample. Reporting the presence of depressive symptoms was also significantly related to reporting of increased use of avoidance coping skills, lower levels of optimism, and a lower reported perceived social support of family and friends (Korhonen, Antikainn, Peiponen, Lehtonen, & Viinamaki, 2002; Lewinsohn, et al., 2003). The findings in this study are consistent with those reported in the literature with reporting of depressive symptoms being significantly negatively correlated with optimism, perceived social support of family and perceived social support of friends as well as being significantly positively correlated with avoidance coping. The findings in this study also supported the hypotheses that psychosocial factors have a mediating effect on gender, negative life events and depression. This supports findings in the literature (Puskar, Sereika, & Tusaie-Mumford, 2003) that indicate the area to examine for intervention development, to decrease reporting of depressive symptoms, is psychosocial factors (i.e. coping).

c. Substance Abuse

Over 74% of subjects in this rural adolescent sample report that they have used alcohol at least once, and 53% of subjects report having tried at least one other drug such as cocaine or marijuana. Over 38% smoke at least occasionally.

Factors in the literature found to effect substance abuse included both family and peer support (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Petraitis, Flay, Miller, Torpy, & Greiner, 1998; Schiffman, 2004). These findings were partially supported by the findings of this study with perceived social support of family

significantly negatively related to alcohol, drugs, and smoking. Perceived social support of family was also significant in the reliability of the proposed model distinguishing between those subjects who reported smoking at least occasionally and those who did not. Having an adult female parent living in the house and having an adult male parent living in the house were both significantly negatively correlated with a subject reporting the use of at least one other drug besides alcohol or reported smoking. However, only 'adult female living in the house' affected the reliability of the model to distinguish between those subjects who reported using another drug and those that did not. Perceived social support of friends was not significantly related to substance abuse in this sample of rural adolescents.

Resnick, Bearman, Blum, Bauman, Harris, Jones, Tabor, Beuhring, Siebing, Shew, Ireland, Bearinger, and Udry (1997) found that in a large, national sample of adolescents who work 20 hours or more a week have higher association with substance abuse. There was no significant relationship between the subjects having a job and alcohol, drugs, or smoking in this smaller rural sample.

The literature also states that substance abuse is related to high negative affectivity and utilization of substance abuse to cope with life stress (Baker, 2004; Shoal & Giancola, 2003). In this study, number of negative life events and avoidance coping was significantly positively related to all areas of the outcome substance abuse (alcohol, drugs, and smoking), supporting the previous findings in the literature.

The fact that optimism and perceived social support of family are significantly negatively related to substance abuse; avoidance coping was significantly positively correlated with substance abuse; and all three were found to be potential mediators between stress and substance abuse in rural adolescents indicates that psychosocial

factors would be the area to target with an intervention in the future. This supports the literature indicating that one area within psychosocial factors to target for intervention development is coping (Puskar, Sereika, & Tusaie-Mumford, 2003). Parent connectedness can also have an impact on adolescent outcomes (Resnick, et. al., 1997). Another focus for intervention development may be a community-based intervention to target improving the relationship between parents and adolescents. With perceived social support of family being negatively related to all substance abuse in this sample, it is important to consider the impact improving this relationship could have on the outcome of substance abuse.

B. Limitations of the Study

This study includes several limitations. This was a secondary data analysis; the goals of the primary study were not the same as those of the secondary study. The data collected and the instruments used to collect that data may not best support the investigation of the aims posed in this secondary study. There may be other potentially confounding variables (e.g., self-esteem) that should also be included when examining the relationships between demographics, stress, psychosocial factors and the outcomes.

Use of self-report instruments creates certain limitations that need to be considered when interpreting the results, such as: issues with memory being incorrect; incomplete memory; and misrepresentation due to subjects attempting to show themselves positively (Lazarus and Folkman, 1984). Subjects may also have difficulty with interpreting language and unintentionally incorrectly answer items. Subjects could misread or skip items and incorrectly mark the instrument- resulting in erroneous data

results. Because this is a secondary data analysis, data has been de-identified. There was not the opportunity to go back to subjects for corrections of missing data and unlikely answers. Imputation was used for the continuous variables with missing data and decisions were made about keeping in outliers based on statistics and reason, not on clarification of the answer with the actual subject.

Another limitation is the cross-sectional design. Longitudinal data would better evaluate the model, particularly the Lazarus construct of Causal Antecedents (Demographics), the Lerner construct of Plasticity (Stress-Life Events), and the combined construct proposed in this model: Mediating Processes/Embeddedness (Psychosocial Factors). The lack of longitudinal data limits the ability of the investigator to track the patterns in change of the predictor variables (Demographics), the potential mediating variables (Stress and Psychosocial Factors) and their influence on outcomes (Anxiety, Depression, and Substance Abuse) over time. There is also the inability to look at these interactions in relation to the adolescent's development into an adult. Also, Lerner's theory adds itself to reciprocity. This study only examined the relationship of the variables in one hypothesized direction.

There were limitations based on the type of analysis that could be used. Also the discrete, categorical, and nominal nature of some of the data necessitated the use of binomial logistic regression. Although free of restrictions, it can sometimes lead to overestimations in the size of associations between the predictors (Tabachnick & Fidell, 2001). Although, the relationships between the variables in the constructs were examined and reported through bivariate correlations (correlations <.70) and multicollinearity was found not to be present, the potential impact that the interaction between the variables in the construct 'psychosocial factors' cause on the model was not an aim of this study and

was therefore not examined. The results of the regressions used in this study (multiple linear and binomial logistic) also should be interpreted cautiously with regards to causality. Additional path analysis and/or structural equation modeling (SEM) may be used in future studies to further investigate Specific Aim 3 of this study to build a predictive, non-recursive model.

Finally, the lack of ability to generalize the results of this study is also a limitation. Due to the sample being primarily Caucasian females, these results may not apply to other rural adolescent populations. Rural adolescents in other geographic regions in the country may include African Americans, Hispanics, Native Americans, and the Amish. The presentation of anxiety and depressive symptoms, and the reported substance abuse in these populations may not be the same as those found in this rural adolescent population. Ethnic and cultural influences may impact the presentation of the outcomes.

C. Implications for Future Research

There were definite gender differences within this sample. Further testing using longitudinal data would assist in clarifying these differences and support the development of gender specific interventions. Gender differences may not be the only differences found within the rural adolescent population. Including other rural adolescent populations would also assist in being able to generalize these findings. In Western Pennsylvania, the population is primarily Caucasian. In other geographical regions in the United States, rural populations consist of many different cultures and ethnic groups- Amish, Hispanic, African American, and Native American. Conducting studies in which different groups within the rural adolescent population are also included will assist in identifying important differences and similarities between the subgroups that may be created by

gender, geographic location, culture, and ethnicity. Examining and understanding any empirical differences and similarities between the subgroups would impact the development of interventions and the generalizability of study results.

As the rate of mental disorders continues to increase in adolescents, the use of empirical data to develop successful interventions becomes critical. These interventions can be preventative, promotional, diagnostic, or treatment based. Interventions that assist adolescents in assessing and reframing situations such as life events may be effective. Teaching cognitive reframing as part of an intervention may impact adolescent optimism and perceptions of social support, and improve their choice of coping skills. Getting parents involved with a community- or school-based intervention may also benefit adolescents. Social support of family can have a positive impact on outcomes.

For rural adolescents who lack access to health care and mental health services, primary care practitioners (such as nurse practitioners), the school nurse, or a school councilor may be their only opportunity for health care and/or mental health screening and referral. To prevent the continued rise in the diagnosis of mental disorders and decrease the subsequent costs (financial and otherwise) to the individual and society as a whole, it is imperative that a multidisciplinary approach is taken to study populations at risk (e.g., rural adolescents). Continued knowledge gained from research in the rural communities and school districts will allow for greater understanding of the issues that face this population and for the development of empirically supported, comprehensive school and community based interventions. Building upon the findings of this study to develop a longitudinal study using SEM to better test such a complex model would lend itself to developing stronger conclusions on which to develop/base interventions on.

Increased public awareness, health practitioner, and even school involvement can ensure that future generations develop into healthy productive adults.

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APPENDICIES

University of Pittsburgh
Institutional Review Board

Exempt and Expedited Reviews

3500 Fifth Avenue
Suite 100
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Phone: 412.383.1480
Fax: 412.383.1508

University of Pittsburgh FWA: 00006790
University of Pittsburgh Medical Center: FWA 00006735
Children's Hospital of Pittsburgh: FWA 00000600

TO: Nickole Tickerhoof-George

FROM: Sue R. Beers, Ph.D., Vice Chair

DATE: June 6, 2005

PROTOCOL: Stress, Psychosocial Factors, and the Outcomes of Anxiety, Depression, and Substance Abuse in Rural Youth

IRB Number: 0505158

The above-referenced protocol has been reviewed by the University of Pittsburgh Institutional Review Board. Based on the information provided in the IRB protocol, this project meets all the necessary criteria for an exemption, and is hereby designated as "exempt" under section 45 CFR 46.101(b)(4).

The regulations of the University of Pittsburgh IRB require that exempt protocols be re-reviewed every three years. If you wish to continue the research after that time, a new application must be submitted.

- If any modifications are made to this project, please submit an 'exempt modification' form to the IRB.
- Please advise the IRB when your project has been completed so that it may be officially terminated in the IRB database.
- This research study may be audited by the University of Pittsburgh Research Conduct and Compliance Office.

Approval Date: June 6, 2005
Expiration Date: June 6, 2008

SRB: kv

DEMOGRAPHIC FORM

ID # ☐☐☐☐ DATE ☐☐ / ☐☐ / ☐☐ (mm / dd / yy)

INSTRUCTIONS: On all questionnaires, for optimum accuracy, it is recommended that characters be written block style without touching sides.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9																

Shade circles like this: ●
Not like this: ⊗ ✓

Directions: Please complete the following:

FOR OFFICE USE ONLY ○ ○ ○ (School)

Sex: ○ Female ○ Male

Race: ○ White ○ Asian ○ Black ○ Native American ○ Hispanic ○ Other _____ (specify)

Birthdate: ☐☐ / ☐☐ / ☐☐ (mm / dd / yy)

Grade: ○ 9th ○ 11th ○ 10th ○ 12th

Program: ○ Academic ○ Business ○ Vocational ○ Remedial

Are you taking advanced placement courses? ○ Yes ○ No

Special Program: Hearing impaired or other program: _____ (specify)

Do you have a job? ○ Yes ○ No

If you do have a job:
What type of job do you have? _____

Approximately how many hours per week do you work (on average)? ☐☐.☐

For Office Use Only ☐☐

What kind of transportation do you use to get to and from school most of the time?

○ school bus ○ drive self ○ other (specify)_____
○ someone drives me ○ walk

Study ID

1	0	3

25502

ID Number: _____ (For internal use only)

Test Date: ___/___/___ (For internal use only)

Please indicate which of the following family members you live with most of the time.

Select Only 1	Select Only 1	Select All that Apply	Indicate number of siblings
○ Natural mother	○ Natural father	○ Natural brother(s)/sister(s)	
○ Step mother	○ Step father	○ Step brother(s)/sister(s)	
○ Foster mother	○ Foster father	○ Foster brother(s)/sister(s)	
○ No mother	○ No father	○ No brothers/sisters	

List any other people who also live on the home with you who are not listed above, and include their relationship to you or your family.

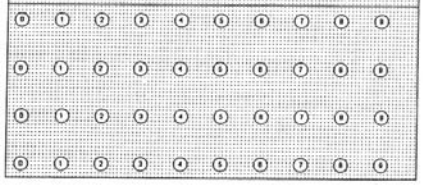
_____

_____

_____

_____

FOR OFFICE USEONLY



Indicate your birth order for your birth family. Do not include step or foster brothers or sisters.

○ Only child	○ 4th born
○ First born (oldest)	○ 5th born
○ 2nd Born	○ 6th born
○ 3rd born	○ 7th born

Write in the name of the teacher you are usually with this period: _____

If you want to talk to someone about any problems right away, please write in your name: _____

With whom do you wish to talk? ○ Counselor ○ Administrator ○ Nurse

Has there been a death in your immediate family in the past year? ○ Yes ○ No

Has there been a death of a close friend in the past year? ○ Yes ○ No

25502

ID # ☐☐☐☐ Date ☐☐ / ☐☐ / ☐☐
mm dd yy

LIFE EVENTS CHECKLIST

Directions: Below is a list of things that sometimes happen to people. Fill in the circle under *Yes* or *No* to indicate if you have experienced the events during the past year (12 months). For each of these events you indicate, also rate the event as a *Good* event or as a *Bad* event. Finally, indicate how much you feel the event has changed or has had an impact on your life by filling the circle of the appropriate statement. Remember, for each event you have experienced during the past year, (1) fill in a circle under *Yes* or *No* to indicate if you experienced the event, (2) indicate whether you viewed the event as a good or bad event, and (3) indicate how much effect the event has had on your life.

To get some idea of the type of events you will be asked to rate, please read over the entire list before you begin. Only respond to those events you have actually experienced during the past year.

			Type of Event		Effect of Event on Your Life			
Event	Yes	No	good	bad	no effect	some-what	moderate	great effect
1. Moving to new home	○	○	①	②	⓪	①	②	③
2. New brother or sister	○	○	①	②	⓪	①	②	③
3. Changing to new school	○	○	①	②	⓪	①	②	③
4. Serious illness or injury of family member	○	○	①	②	⓪	①	②	③
5. Parents divorced	○	○	①	②	⓪	①	②	③
6. Increased number of arguments between parents	○	○	①	②	⓪	①	②	③
7. Mother or father lost job	○	○	①	②	⓪	①	②	③
8. Death of a family member	○	○	①	②	⓪	①	②	③
9. Parents separated	○	○	①	②	⓪	①	②	③
10. Death of a close friend	○	○	①	②	⓪	①	②	③
11. Increased absence of parent from the home	○	○	①	②	⓪	①	②	③
12. Brother or sister leaving home	○	○	①	②	⓪	①	②	③
13. Serious illness or injury of close friend	○	○	①	②	⓪	①	②	③

Study ID
1 0 3

ID Number: _____ (For internal use only)

Test Date: ___/___/___ (For internal use only)

Event	Yes	No	Type of Event: good	Type of Event: bad	Effect of Event on Your Life: no effect	Effect of Event on Your Life: some-what	Effect of Event on Your Life: moderate	Effect of Event on Your Life: great effect
14. Parent getting into trouble with the law	○	○	①	②	⓪	①	②	③
15. Parent getting a new job	○	○	①	②	⓪	①	②	③
16. New stepmother of stepfather	○	○	①	②	⓪	①	②	③
17. Parent going to jail	○	○	①	②	⓪	①	②	③
18. Change in parents' financial status	○	○	①	②	⓪	①	②	③
19. Trouble with brother or sister	○	○	①	②	⓪	①	②	③
20. Special recognition for good grades	○	○	①	②	⓪	①	②	③
21. Joining a new club	○	○	①	②	⓪	①	②	③
22. Losing a close friend	○	○	①	②	⓪	①	②	③
23. Decrease in number of arguments with parents	○	○	①	②	⓪	①	②	③
24. Male: girlfriend getting pregnant	○	○	①	②	⓪	①	②	③
25. Female: getting pregnant	○	○	①	②	⓪	①	②	③
26. Losing a job	○	○	①	②	⓪	①	②	③
27. Making the honor role	○	○	①	②	⓪	①	②	③
28. Getting your own car	○	○	①	②	⓪	①	②	③
29. New boyfriend/girlfriend	○	○	①	②	⓪	①	②	③
30. Failing a grade	○	○	①	②	⓪	①	②	③
31. Increase in number of arguments with parents	○	○	①	②	⓪	①	②	③
32. Getting a job of your own	○	○	①	②	⓪	①	②	③
33. Getting into trouble with police	○	○	①	②	⓪	①	②	③

ID Number: _____ (For internal use only)

Test Date: ___/___/___ (For internal use only)

Event	Yes	No	Type of Event: good	Type of Event: bad	Effect of Event on Your Life: no effect	Effect of Event on Your Life: some-what	Effect of Event on Your Life: moderate	Effect of Event on Your Life: great effect
34. Major personal illness or injury	○	○	①	②	⓪	①	②	③
35. Breaking up with boyfriend/girlfriend	○	○	①	②	⓪	①	②	③
36. Making up with boyfriend/girlfriend	○	○	①	②	⓪	①	②	③
37. Trouble with teacher	○	○	①	②	⓪	①	②	③
38. Male: girlfriend having abortion	○	○	①	②	⓪	①	②	③
39. Female: having abortion	○	○	①	②	⓪	①	②	③
40. Failing to make an athletic team	○	○	①	②	⓪	①	②	③
41. Being suspended from school	○	○	①	②	⓪	①	②	③
42. Making failing grades on report card	○	○	①	②	⓪	①	②	③
43. Making an athletic team	○	○	①	②	⓪	①	②	③
44. Trouble with classmates	○	○	①	②	⓪	①	②	③
45. Special recognition for athletic performance	○	○	①	②	⓪	①	②	③
46. Getting put in jail	○	○	①	②	⓪	①	②	③
Other events which have had a impact on your life. List and rate.								
47. _____ _____	○	○	①	②	⓪	①	②	③
48. _____ _____	○	○	①	②	⓪	①	②	③
49. _____ _____	○	○	①	②	⓪	①	②	③
50. _____ _____	○	○	①	②	⓪	①	②	③

LIFE ORIENTATION TEST (LOT-R)

Instrument Number: 217 (For internal use only)

ID Number: ____

Study ID: 103

Date: ____ / ____ / ____ (month) (day) (year)

INSTRUCTIONS: Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:

[0] = Strongly Disagree
[1] = Disagree
[2] = Neutral
[3] = Agree
[4] = Strongly Agree

Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers. Fill in one circle for each question. Do not skip any questions.

Shade circles like this: ●
Not like this: ⊗ ✓

	0 Strongly Disagree	1 Disagree	2 Neutral	3 Agree	4 Strongly Agree
1. In uncertain times, I usually expect the best.	○	○	○	○	○
2. It is easy for me to relax.	○	○	○	○	○
3. If something can go wrong for me, it will.	○	○	○	○	○
4. I am always optimistic about my future.	○	○	○	○	○
5. I enjoy my friends a lot.	○	○	○	○	○
6. It is important for me to keep busy.	○	○	○	○	○
7. I hardly ever expect things to go my way.	○	○	○	○	○
8. I do not get upset too easily.	○	○	○	○	○
9. I rarely count on good things happening to me.	○	○	○	○	○
10. Overall, I expect more good things to happen to me than bad.	○	○	○	○	○

ID # ____ Test Date: __ / __ / __
MM DD YY

Perceived Social Support Scale

PSS-Fr and PSS-Fa Scales

Directions: The statements which follow refer to feelings and experiences which occur to most people at one time or another in their relationships with friends. For each statement there are three possible answers: Yes, No, Don't know. Please fill in the circle of the answer you choose for each item.

Yes	No	Don't Know	
○	○	○	1. My friends give me the moral support I need.
○	○	○	2. Most other people are closer to their friends than I am.
○	○	○	3. My friends enjoy hearing about what I think.
○	○	○	4. Certain friends come to me when they have problems or need advise.
○	○	○	5. I rely on my friends for emotional support.
○	○	○	6. If I felt that one or more of my friends were upset with me, I'd just keep it to myself.
○	○	○	7. I feel that I'm on the fringe in my circle of friends.
○	○	○	8. There is a friend I could go to if I were just feeling down, without feeling funny about it later.
○	○	○	9. My friends and I are very open about what we think about things.
○	○	○	10. My friends are sensitive to my personal needs.
○	○	○	11. My friends come to me for emotional support.
○	○	○	12. My friends are good at helping me solve problems.
○	○	○	13. I have a deep sharing relationship with a number of friends.
○	○	○	14. My friends get good ideas about how to do things or make things from me.
○	○	○	15. When I confide in friends, it makes me feel uncomfortable.
○	○	○	16. My friends seek me out for companionship.
○	○	○	17. I think that my friends feel that I'm good at helping them solve problems.
○	○	○	18. I don't have a relationship with a friend that is as intimate as other people's relationships with friends.
○	○	○	19. I've recently gotten a good idea about how to do something from a friend.
○	○	○	20. I wish my friends were much different.

Study ID

1	0	3

ID Number: _____ (For internal use only)

Test Date: ___/___/___ (For internal use only)

Directions: The statements which follow refer to feelings and experience which occur to most people at one time or another in their relationships with families. For each statement there are three possible answers: Yes, No, Don't know. Please fill in the circle of the answer you choose for each item.

Yes	No	Don't Know		
○	○	○	1.	My family gives me the moral support I need.
○	○	○	2.	I get good ideas about how to do things or make things from my family.
○	○	○	3.	Most other people are closer to their family that I am.
○	○	○	4.	When I confide in the members of my family who are closest to me, I get the idea that it makes them uncomfortable.
○	○	○	5.	My family enjoys hearing about what I think.
○	○	○	6.	Members of my family share many of my interests.
○	○	○	7.	Certain members of my family come to me when they have problems or need advice.
○	○	○	8.	I rely on my family for emotional support.
○	○	○	9.	There is a member of my family I could go to if I were just feeling down, without feeling funny about it later.
○	○	○	10.	My family and I are very open about what we think about things.
○	○	○	11.	My family is sensitive to my personal needs.
○	○	○	12.	Members of my family come to me for emotional support.
○	○	○	13.	Members of my family are good at helping me solve problems.
○	○	○	14.	I have a deep sharing relationship with a number of members of my family.
○	○	○	15.	Members of my family get good ideas about how to do things or make things from me.
○	○	○	16.	When I confide in members of my family, it makes me uncomfortable.
○	○	○	17.	Members of my family seek me out for companionship.
○	○	○	18.	I think that my family feels that I'm good at helping them solve problems.
○	○	○	19.	I don't have a relationship with a member of my family that is as close as other people's relationships with family members.
○	○	○	20.	I wish my family were much different.

CRI-YOUTH FORM

Item Booklet

Rudolf H. Moos, Ph.D.

Directions:

On the accompanying answer sheet, please fill in your name, today's date, and your sex, age, grade in school, and ethnic group. Please mark all your answers on the answer sheet. **Do not write in this booklet.**

PAR Psychological Assessment Resources, Inc./P.O. Box 998/Odessa, FL 33556/Toll-Free 1-800-331-TEST

2 3 4 5 6 7 8 9 Printed in the U.S.A.

This form is printed in blue ink on recycled paper. Any other version is unauthorized.

Part 1

This booklet contains questions about how you deal with important problems that come up in your life. Please think about the most important problem or stressful situation you have experienced **in the last 12 months** (for example, a problem with your parents, a problem at school, a serious illness or accident, or the death of a family member or a friend). Briefly describe the problem in the space provided in Part 1 of the answer sheet. If you have not experienced a major problem, list a minor problem that you have had to deal with. Then answer each of the 10 questions about the problem or situation (listed below and again on the answer sheet) by circling the appropriate response:

Circle "**DN**" if your response is **D**EFINITELY **N**O. (**DN**) MN MY DY

Circle "**MN**" if your response is **M**AINLY **N**O. DN (**MN**) MY DY

Circle "**MY**" if your response is **M**AINLY **Y**ES. DN MN (**MY**) DY

Circle "**DY**" if your response is **D**EFINITELY **Y**ES. DN MN MY (**DY**)

1. Have you ever faced a problem like this before?
2. Did you know this problem was going to happen to you?
3. Did you have enough time to get ready to deal with the problem?
4. When this problem happened, did you think about how it might harm you?
5. When this problem happened, did you think of it as a challenge?
6. Was this problem caused by something you did?
7. Was this problem caused by something someone else did?
8. Did anything good come out of dealing with this problem?
9. Has this problem or situation been worked out?
10. If the problem has been worked out, did it turn out all right for you?

Part 2

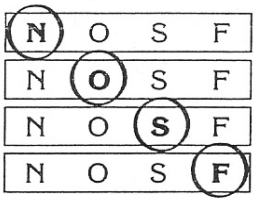
Read each item carefully and indicate how often you took that action to deal with the problem you described in Part 1. Circle the appropriate response on the answer sheet:

Circle "**N**" if your response is NO, **N**ot at all.

Circle "**O**" if your response is YES, **O**nce or Twice.

Circle "**S**" if your response is YES, **S**ometimes.

Circle "**F**" if your response is YES, **F**airly often.



There are 48 items in Part 2. Remember to mark all your answers on the answer sheet. Please answer each question as accurately as you can. All your answers are strictly confidential. If you do not wish to answer a question, please circle the number of that question on the answer sheet to indicate that you have decided to skip it. If an item does not apply to you, please write **NA** (**N**ot **A**pplicable) in the box to the right of the number for that item. If you wish to change an answer, make an **X** through your first answer and circle the new answer. Note that answers are numbered across in rows on Part 2 of the answer sheet.

1. Did you think of different ways to deal with the problem?
2. Did you tell yourself things to make yourself feel better?
3. Did you talk with a parent or other family member about the problem?
4. Did you decide on one way to deal with the problem and do it?
5. Did you try to forget the whole thing?
6. Did you feel that time would make a difference—that the only thing to do was wait?
7. Did you get involved in new activities?
8. Did you take it out on other people when you felt angry or sad?
9. Did you try to step back from the problem and think about it?
10. Did you tell yourself that things could be worse?
11. Did you talk with a friend about the problem?
12. Did you know what had to be done and try hard to make things work?
13. Did you try not to think about the problem?
14. Did you realize that you had no control over the problem?
15. Did you try to make new friends?
16. Did you take a chance and do something risky?
17. Did you go over in your mind what you would say or do?
18. Did you try to see the good side of the situation?
19. Did you talk with an adult like a teacher, coach, counselor, clergyman, or doctor?
20. Did you decide what you wanted and try to get it?

21. Did you daydream or imagine things being better than they were?

22. Did you think that the outcome would be decided by fate?

23. Did you begin to read more often for enjoyment?

24. Did you yell or shout to let off steam?

25. Did you think about how things might turn out?

26. Did you keep thinking about how you were better off than other people with the same problems?

27. Did you look for help from other kids or groups with the same type of problem?

28. Did you try at least two different ways to solve the problem?

29. Did you put off thinking about the situation, even though you knew you would have to at some point?

30. Did you accept the problem because nothing could be done to change it?

31. Did you begin to spend more time in fun activities, like sports, parties, and going shopping?

32. Did you cry to let your feelings out?

33. Did you try to make sense out of why this problem happened to you?

34. Did you try to tell yourself that things would get better?

35. Did you ask a friend to help you solve the problem?

36. Did you try to do more things on your own?

37. Did you wish the problem would go away or somehow be over with?

38. Did you expect the worst possible outcome?

39. Did you try to keep busy with school or other things to help you cope?

40. Did you do something that you didn't think would work, but at least you were doing something?

41. Did you think about the new hardships that would be placed on you?

42. Did you think about how this situation could change your life for the better?

43. Did you ask for sympathy and understanding from someone?

44. Did you take things a day at a time, one step at a time?

45. Did you try to deny how serious the problem really was?

46. Did you lose hope that things would ever be the same?

47. Did you find new ways to enjoy life?

48. Did you listen to music as a way to cope?

CRI-YOUTH ANSWER SHEET

ID # ☐☐☐☐ Test Date: ☐☐ / ☐☐ / ☐☐ (MM / DD / YY)

Part 1

Describe the problem or situation _____

DN = Definitely No MN = Mainly No MY = Mainly Yes DY =Definitely Yes

1. Have you ever faced a problem like this before?	○ DN	○ MN	○ MY	○ DY
2. Did you know this problem was going to happen to you?	○ DN	○ MN	○ MY	○ DY
3. Did you have enough time to get ready to deal with this problem?	○ DN	○ MN	○ MY	○ DY
4. When this problem happened, did you think of it as a threat?	○ DN	○ MN	○ MY	○ DY
5. When this problem happened, did you think of it as a challenge?	○ DN	○ MN	○ MY	○ DY
6. Was this problem caused by something you did?	○ DN	○ MN	○ MY	○ DY
7. Was this problem caused by something someone else did?	○ DN	○ MN	○ MY	○ DY
8. Did anything good come out of dealing with this problem?	○ DN	○ MN	○ MY	○ DY
9. Has this problem or situation been worked out?	○ DN	○ MN	○ MY	○ DY
10. If the problem has been worked out, did it turn out all right for you?	○ DN	○ MN	○ MY	○ DY

Part 2

N = No, Not at all O = Yes, Once or twice S = Yes, Sometimes F = Yes, Fairly often

1 N O S F	2 N O S F	3 N O S F	4 N O S F	5 N O S F	6 N O S F	7 N O S F	8 N O S F
9 N O S F	10 N O S F	11 N O S F	12 N O S F	13 N O S F	14 N O S F	15 N O S F	16 N O S F
17 N O S F	18 N O S F	19 N O S F	20 N O S F	21 N O S F	22 N O S F	23 N O S F	24 N O S F
25 N O S F	26 N O S F	27 N O S F	28 N O S F	29 N O S F	30 N O S F	31 N O S F	32 N O S F
33 N O S F	34 N O S F	35 N O S F	36 N O S F	37 N O S F	38 N O S F	39 N O S F	40 N O S F
41 N O S F	42 N O S F	43 N O S F	44 N O S F	45 N O S F	46 N O S F	47 N O S F	48 N O S F

PAR Psychological Assessment Resources, Inc./P O. Box98/Odessa, FL 33556

Study ID 1 0 3

21443

CHILD FORM

Center for Research in Chronic Disorders

Instrument Number: 215

(For internal use only)

Study ID: 103

ID Number: ____ Test Date: __ / __ / __ (month) (day) (year)

Please keep these rules in mind when responding to the questions....

Shade circles like this: ●
Not like this: ⊗ ✓

For optimum accuracy, it is recommended that characters be written block style without touching the sides of the blocks, such as in the following examples. Place only one letter or one number in each box as shown....

0 1 2 3 4 5 6 7 8 9

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Directions: Below is a list of statements that describe how people feel. Read each statement carefully and decide if it is "**Not True or Hardly Ever True**" or "**Somewhat True or Sometimes True**" or "**Very True or Often True**" for you. Then for each statement, fill in one circle that corresponds to the response that seems to describe you **now or within the past 3 months**. Please respond to all statements as well as you can, even if some do not seem to concern you.

	Not True or Hardly Ever True	Somewhat True or Sometimes True	Very True or Often True
1. When I feel frightened it is hard to breathe.	○	○	○
2. I get headaches when I am at school.	○	○	○
3. I don't like to be with people I don't know well.	○	○	○
4. I get scared if I sleep away from home.	○	○	○

(continued on next page)

15141

ID Number: _ _ _ _ (for internal use only) Test Date: _ _ / _ _ / _ _ (for internal use only) Study ID: 1 0 3

	Not True or Hardly Ever True	Somewhat True or Sometimes True	Very True or Often True
5. I worry about other people liking me.	○	○	○
6. When I get frightened I feel like passing out.	○	○	○
7. I am nervous.	○	○	○
8. I follow my mother or father wherever they go.	○	○	○
9. People tell me that I look nervous.	○	○	○
10. I feel nervous with people I don't know well.	○	○	○
11. I get stomachaches at school.	○	○	○
12. When I get frightened I feel like I am going crazy.	○	○	○
13. I worry about sleeping alone.	○	○	○
14. I worry about being as good as other kids.	○	○	○
15. When I get frightened I feel like things are not real.	○	○	○
16. I have nightmares about something bad happening to my parents.	○	○	○
17. I worry about going to school.	○	○	○
18. When I get frightened my heart beats fast.	○	○	○
19. I get shaky.	○	○	○
20. I have nightmares about something bad happening to me.	○	○	○
21. I worry about things working out for me.	○	○	○
22. When I get frightened I sweat a lot.	○	○	○

(continued on next page)

ID Number: _ _ _ _ (for internal use only) Test Date: _ _ / _ _ / _ _ (for internal use only) Study ID: 1 0 3

	Not True or Hardly Ever True	Somewhat True or Sometimes True	Very True or Often True
23. I am a worrier.	○	○	○
24. I get really frightened for no reason at all.	○	○	○
25. I am afraid to be alone in the house.	○	○	○
26. It is hard to talk with people I don't know well.	○	○	○
27. When I get frightened I feel like I am choking.	○	○	○
28. People tell me that I worry too much.	○	○	○
29. I don't like to be away from my family.	○	○	○
30. I am afraid of having anxiety (panic) attacks.	○	○	○
31. I worry that something bad might happen to my parents.	○	○	○
32. I feel shy with people I don't know well.	○	○	○
33. I worry about what is going to happen in the future.	○	○	○
34. When I get frightened I feel like throwing up.	○	○	○
35. I worry about how well I do things.	○	○	○
36. I am scared to go to school.	○	○	○
37. I worry about things that have already happened.	○	○	○
38. When I get frightened I feel dizzy.	○	○	○

ABOUT MYSELF

RADS-Forms HS

by William M. Reynolds

Directions

On the next page are a number of sentences that people use to decribe their feelings. You will be reading each sentence and deciding how often you feel the way the sentence describes. There are no right or wrong answers. Just remember to answer the way you really feel.

ID # ☐☐☐☐ Date ☐☐ / ☐☐ / ☐☐
mm dd yy

Directions

Listed below are some sentences about how you feel. Read each sentence and decide how often *you* feel this way: almost never, hardly ever, sometimes, or most of the time. Fill in the circle under the answer that best describes how you really feel. Remember there are no right or wrong answers. Just choose the answer that tells how you usually feel.

	ALMOST NEVER	HARDLY EVER	SOME-TIMES	MOST OF THE TIME
1. I feel happy	○	○	○	○
2. I worry about school	○	○	○	○
3. I feel lonely	○	○	○	○
4. I feel my parents don't like me	○	○	○	○
5. I feel important	○	○	○	○
6. I feel like hiding from people	○	○	○	○
7. I feel sad	○	○	○	○
8. I feel like crying	○	○	○	○
9. I feel that no one cares about me	○	○	○	○
10. I feel like having fun with other students	○	○	○	○
11. I feel sick	○	○	○	○
12. I feel loved	○	○	○	○
13. I feel like running away	○	○	○	○
14. I feel like hurting myself	○	○	○	○
15. I feel that other students don't like me	○	○	○	○
16. I feel upset	○	○	○	○
17. I feel life is unfair	○	○	○	○
18. I feel tired	○	○	○	○
19. I feel I am bad	○	○	○	○
20. I feel I am no good	○	○	○	○
21. I feel sorry for myself	○	○	○	○
22. I feel mad about things	○	○	○	○
23. I feel like talking to other students	○	○	○	○
24. I have trouble sleeping	○	○	○	○
25. I feel like having fun	○	○	○	○
26. I feel worried	○	○	○	○
27. I get stomachaches	○	○	○	○
28. I feel bored	○	○	○	○
29. I like eating meals	○	○	○	○
30. I feel like nothing I do helps any more	○	○	○	○

Study ID
1 0 3

ID # ☐☐☐☐

Test Date: ☐☐ / ☐☐ / ☐☐
MM DD YY

DUSI

(Youth Version)

1. How many times have you used each of the drugs listed below.

	Fill in the circle that applies to you						
	0 times	1-2 times	3-9 times	10-20 times	More than 20 times	Problem	Preference
Alcohol	○	○	○	○	○	○	○
Cocaine/crack	○	○	○	○	○	○	○
Marijuana/pot	○	○	○	○	○	○	○
Stimulants/uppers	○	○	○	○	○	○	○
LSD/mescaline	○	○	○	○	○	○	○
Tranquilizers	○	○	○	○	○	○	○
Pain killers	○	○	○	○	○	○	○
Heroin/opiates	○	○	○	○	○	○	○
PCP	○	○	○	○	○	○	○
Sniff gases or fumes	○	○	○	○	○	○	○
Other	○	○	○	○	○	○	○

2. Fill in the circle of the drugs that you think you may have a problem with.

3. Shade the circle of the drug that you prefer the most.

Study ID # ☐☐☐

[redacted]

ID Number: _____ (For internal use only)

Test Date: ___/___/___ (For internal use only)

Answer **ALL** of the following questions. Even if a question does not apply exactly, answer according to whether it is MOSTLY YES (TRUE) OR MOSTLY NO (FALSE). Answer the questions as they apply to you **within the past year** and leading up to the present time. Fill in the circle for each question.

YES	NO	**Answer within the past year.**
○	○	1. Have you ever had a craving or very strong desire for alcohol or drugs?
○	○	2. Have you ever had to use more drugs or alchol to get the effect you want?
○	○	3. Have you ever felt that you could not control your alcohol or drug use?
○	○	4. Have you ever felt you were "hooked" on alcohol or drugs?
○	○	5. Have you ever missed out on activities because you spent too much money on drugs or alcohol?
○	○	6. Did you ever break rules, miss curfew, or break the law because you were high on alcohol or drugs?
○	○	7. Do you change rapidly from very happy to very sad or from very sad to very happy because of drugs?
○	○	8. Have you ever had a car accident after using alcohol or drugs?
○	○	9. Have you ever accidentally hurt yourself or someone else after using alcohol or drugs?
○	○	10. Have you ever had a serious arguement or fight with a friend or a family member because of your drinking or drug use?
○	○	11. Have you ever had trouble getting along with any of your friends because of alcohol or drug use?
○	○	12. Have you ever experienced any *withdrawal symptoms* following use of alcohol or drugs (e.g., headaches, nausea, vomiting, shaking)?
○	○	13. Have you ever had a problem remembering what you had done while you were under the effects of drugs or alcohol?
○	○	14. Do you like to play drinking games when you go to parties?
○	○	15. Do you have trouble resisting using alcohol or drugs?

ID # ☐☐☐☐ Test Date: ☐☐ / ☐☐ / ☐☐ (MM / DD / YY)

DIRECTIONS: Below are 39 phrases that describe common adolescent concerns. Please fill in the circle of the number best describing how often this concerns you.

	Never	Occasionally	Often	Always
1) I think my physical development is slower than others	⓪	①	②	③
2) I can get birth control (pills, foam, condoms...)	⓪	①	②	③
3) I can find information about sex	⓪	①	②	③
4) I think I might get AIDS	⓪	①	②	③
5) I think I might get a venereal disease	⓪	①	②	③
6) I worry that I might get pregnant or get someone pregnant	⓪	①	②	③
7) I do self breast/testicular exams	⓪	①	②	③
8) I have problems with my periods/ erections	⓪	①	②	③
9) I have homosexual feelings	⓪	①	②	③
10) I have been sexually abused	⓪	①	②	③
11) I have acne	⓪	①	②	③
12) I have a problem with my weight	⓪	①	②	③
13) I have dental problems	⓪	①	②	③
14) I have trouble seeing	⓪	①	②	③
15) I have trouble hearing	⓪	①	②	③
16) I wet the bed	⓪	①	②	③
17) I have headaches	⓪	①	②	③
18) I worry about my general health	⓪	①	②	③

Study ID 1 0 3

ADOLESCENT INVENTORY

20885

ID Number: _____ (For internal use only)

Test Date: ___/___/___ (For internal use only)

	Never	Occasionally	Often	Always
19) I feel tired often	0	1	2	3
20) I exercise	0	1	2	3
21) I feel lonely	0	1	2	3
22) I feel depressed	0	1	2	3
23) I think about suicide	0	1	2	3
24) I have trouble at home	0	1	2	3
25) I have trouble at school	0	1	2	3
26) I have trouble with the law	0	1	2	3
27) I have a best friend	0	1	2	3
28) I spend more time alone than I wish to	0	1	2	3
29) Other teenagers like to be with me	0	1	2	3
30) I am confused about my future	0	1	2	3
31) I drink alcohol (beer, wine, liquor, etc.)	0	1	2	3
32) I smoke cigarettes and/or use smokeless tobacco	0	1	2	3
33) I use drugs not prescribed for me (crack, marijuana, cocaine, etc.)	0	1	2	3
34) My parents use drugs or alcohol	0	1	2	3
35) My grandparents use drugs or alcohol	0	1	2	3
36) My parents smoke cigarettes and or use smokeless tobacco	0	1	2	3
37) I drive after drinking or using drugs	0	1	2	3
38) I ride with people who have been drinking	0	1	2	3
39) I have been told I have a drinking problem or drug problem	0	1	2	3